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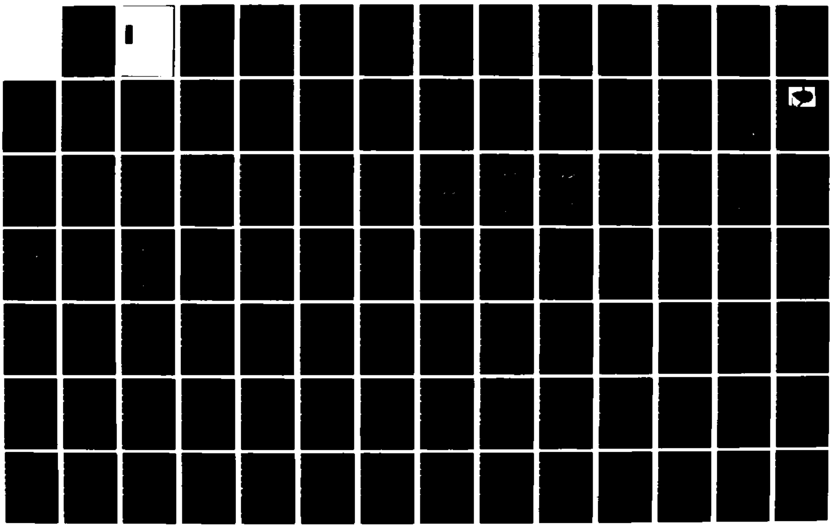

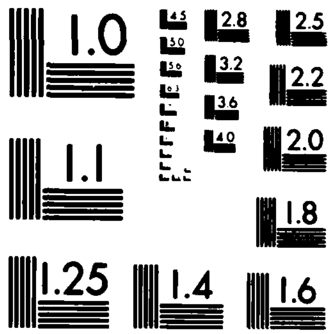

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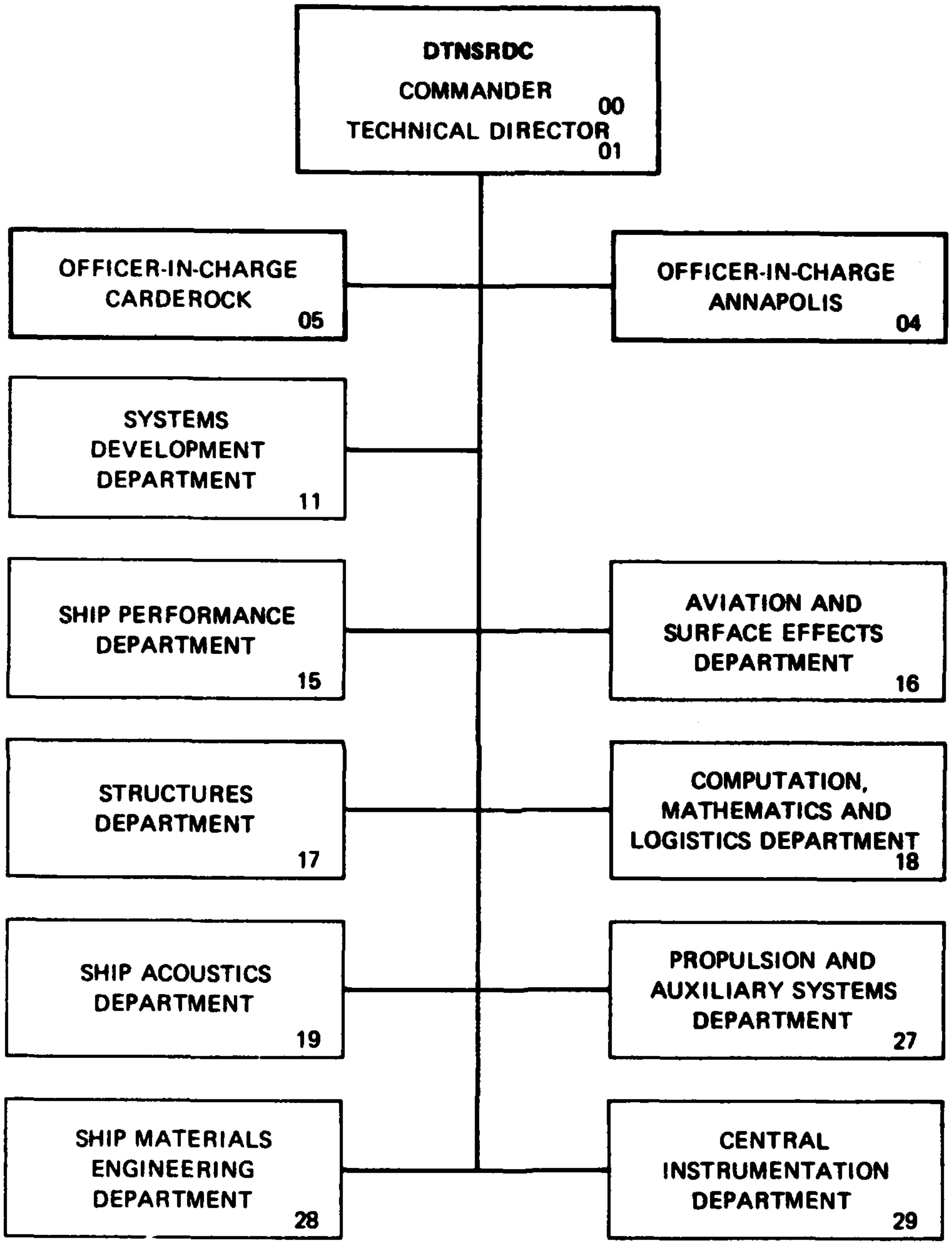

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A comprehensive set of experimental data for flow over the stern of a three-dimensional model having 2:1 elliptic transverse cross sections, suitable for analytical comparisons, is presented. Included in this set are surface pressure and shear stress distributions, static pressure and mean velocity profiles, and Reynolds stresses. The eddy viscosity and mixing length values

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obtained from the measured Reynolds stresses and mean velocity gradients are also presented. The measured and derived data are compared with the predictions of existing three-dimensional theoretical methods. These comparisons confirm the need for improved prediction techniques in the thick turbulent boundary-layer region of the stern.

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NOTATION

a	Length of major elliptical axis at a given x/L
b	Length of minor elliptical axis at a given x/L
C_p	Pressure coefficient $\left(C_p = (p-p_o)/[(1/2)(\rho U_o^2)] = 1 - (U_e/U_o)^2\right)$
C_τ	Stress coefficient $\left(C_\tau = \tau_w/[(1/2)(\rho U_e^2)]\right)$
L	Total body length
ℓ	Mixing length parameter: in the inner region-- $\ell = 0.4\ y\ [1-\exp(-y/A)]$ In the outer region-- $\overline{uv} = \ell^2 \left[\left(\frac{\partial u}{\partial n_e}\right)^2 + \left(\frac{\partial w_\theta}{\partial n_e}\right)^2\right]^{1/2} \frac{\partial u}{\partial n_e}$
n_e	Coordinate measured normal to the body profile in the yz plane
p	Measured local static pressure
p_o	Measured ambient pressure
p_s	Measured static pressure
p_t	Measured dynamic total pressure
q^2	Turbulence parameter $\left(q^2 = \overline{u'^2} + \overline{v'^2} + \overline{w'^2}\right)$
R_L	Reynolds number based on model length $\left(R_L = \frac{U_o L}{\nu}\right)$
U_e	Computed potential flow velocity on the displacement body
U_o	Free-stream velocity
U_δ	Potential flow velocity at the edge of the boundary layer
u, v, w	Mean velocity components in the x, y, and z directions, respectively

u_x, v_n, w_θ	Mean velocity components in the x, n_e, and θ directions, respectively
$\overline{u_x'^2}$, $\overline{v_n'^2}$, $\overline{w_\theta'^2}$	Turbulent fluctuations in the x, n_e, and θ directions, respectively
$\overline{u_x'v_n'}$, $\overline{u_x'w_\theta'}$	Reynolds stresses
x, n_e, θ	Coordinates used to present measured boundary layer data
x, y, z	Nonorthogonal boundary-layer coordinates (see Reference 8)
α	Angle between the body surface and the body axis
δ_a, δ_b	Boundary-layer thickness at major and minor axes, respectively, of elliptical cross section
δ_r	Boundary-layer thickness measured in n_e direction
δ_p^*	Planar displacement thickness
ε	Eddy viscosity
θ	Angular coordinate measure in the y-z plane from the z axis to the line joining the surface offset and elliptic center
$\bar{\theta}$	Angle between the x and z coordinates
ν	Kinematic viscosity of the fluid
ρ	Mass density of the fluid
τ_w	Shear stress at the wall

ABBREVIATIONS

C^2K	Cebeci, Chang, and Kaups (see Reference 8)
cm	Centimeter
m/s	Meter per second
Pa	Pascal

ABSTRACT

A comprehensive set of experimental data for flow over the stern of a three-dimensional model having 2:1 elliptic transverse cross sections, suitable for analytical comparisons, is presented. Included in this set are surface pressure and shear stress distributions, static pressure and mean velocity profiles, and Reynolds stresses. The eddy viscosity and mixing length values obtained from the measured Reynolds stresses and mean velocity gradients are also presented. The measured and derived data are compared with the predictions of existing three-dimensional theoretical methods. These comparisons confirm the need for improved prediction techniques in the thick turbulent boundary-layer region of the stern.

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INTRODUCTION

This work completes the planned experimental study of turbulent boundary layers in the thick stern region of bodies with simple geometries. The stern region is of particular interest since many single-screw propellers operate inside of thick stern boundary layers. To aid in understanding the flow around propellers, we must understand the physics of their environment. The integral and/or differential methods used to predict turbulent boundary-layer characteristcs agree well with experimental data in thin boundary layers. However, predictions from these methods deviate from measured values as the boundary layer thickens. Often, the boundary layer is thicker than the transverse dimension of the model in the stern region, nullifying the basic assumption that the boundary layer is small when compared with model dimensions. It is hoped that some insight into the flow in this complex region can be gained through detailed measurements of the turbulent boundary-layer characteristics in the stern region of simple geometries.

Previous studies have produced comprehensive sets of experimental data for pressure, velocity, and turbulence across the sterns of three axisymmetric models[1,2*] and one three-dimensional model having 3:1 elliptic transverse cross sections.[3] Similar data are reported in this report for a three-dimensional model having 2:1 elliptic transverse cross sections. To minimize the variables associated with the three dimensionality, the 3:1 and 2:1 elliptic models were designed to have the same longitudinal distributions of cross-sectional area as the axisymmetric model tested.[1] The measurements on the axisymmetric models have been used to validate the displacement concept suggested by Preston[4] and Lighthill[5] for computing viscous/inviscid flow interaction. An improved turbulence model was obtained and implemented for computing thick axisymmetric boundary layers.[1,2] Preliminary studies were also made to extend the displacement concept to three dimensions.[3] At present, an efficient computer program for satisfactory solution of viscous/inviscid interactions in three-dimensional flows is not available for comparison with experimental results. Computational developments are in progress and will be forthcoming in a sequel to this report.

The experiments were conducted on the 10.06-ft (3.07-m) fiberglass model of 2:1 elliptic transverse cross section in the DTNSRDC Anechoic Flow Facility at a speed of 100 ft/sec (30.48 m/s), resulting in an overall Reynolds number--based on length--of 6.5×10^6. Pressure taps, embedded in the model, were used to measure the pressure distribution on the surface. A Preston tube was taped to the stern near the pressure taps to measure the shear stress distribution on the model surface, and a Prandtl-type pitot-static pressure probe was used to measure static pressure across the boundary layer. Velocity and turbulence characteristics were measured using a two-element hot-film sensor and were analyzed with an on-line computer. Measurements include mean velocity profiles, turbulence intensities, Reynolds stresses, eddy viscosity, and mixing length.

Several experimental quantities are compared with predictions of existing analytical/numerical methods. The potential flow distribution on the body surface is computed using an updated version of the Hess-Smith[6] Potential Flow Computer Program, known as the XYZ Potential Flow (XYZPF) computer code of Dawson and Dean.[7]

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*A complete listing of references is given on page 87.

Boundary-layer predictions are made using the McDonnell Douglas Corporation's C^2K (Cebeci, Chang, and Kaups[8]) computer code. The current developmental stage of the three-dimensional displacement theory does not warrant successive iterations of these codes; thus, comparisons are made for the unmodified body using preliminary potential-flow values of C_p without considering viscous/inviscid interaction. Flow separation is predicted on the model by the C^2K code at axial locations x greater than 83% of the body length L and at angular locations θ greater than 87°. The separated region is predicted to grow downstream and covers the model as shown by the shaded area in Figure 1. Flow visualization techniques using oil dots identified a much smaller region of flow separation, indicated by the solid region of Figure 1. Comparison of the predicted and measured results shows accurate values of pressure, shear stress, and mean velocity profiles in locations where the boundary layer is thin compared with the cross-sectional area. The measured eddy viscosity distribution is compared with the thin-boundary-layer model of Cebeci,[8,9] and is found to be smaller than predictions.

In the following sections, the experimental techniques and geometry of the 2:1 elliptic transverse cross-section model are given in detail. The measurements of mean velocities, turbulence intensities, and Reynolds stresses were analyzed to obtain eddy viscosity and mixing length. The raw data and derived results are given in tabular form for independent use by other investigators. The need for thick stern-boundary-layer data to verify various numerical solutions has been demonstrated in recent publications (e.g., Muraoka,[10] Zhou,[11] Larsson and Johansson,[12] and many others).

WIND TUNNEL AND MODEL

The experimental investigation was conducted in the DTNSRDC Anechoic Flow Facility. The wind tunnel has a closed jet test section that is 8-ft (2.4-m) square and 13.75-ft (4.19-m) long. The corners have fillets which are carried through the contraction. The test section is followed by an acoustically lined large chamber, 23.5-ft (7.16-m) long. It was found previously, by Huang et al.,[1] that the

ambient free-stream turbulence levels are 0.075, 0.090, 0.100, and 0.12-0.15 for free-stream velocities U_o of 24.4, 30.5, 38.1, and 45.7 m/s, respectively. Integration of the measured noise spectrum levels in the test section from 10 to 10,000 Hz indicated that the typical background acoustic noise levels at 30.5 m/s were about 93 dB re 0.0002 dyne/cm^2 (0.0002 Pa). These levels of ambient turbulence and acoustic noise were considered low enough so as not to unfavorably affect the measurement of boundary-layer characteristics. The maximum air speed that can be achieved is 200 ft/sec (61 m/s); in the present experiments, the wind tunnel velocity was held constant at 100 ft/sec (30.48 m/s).

A simple three-dimensional model having 2:1 elliptical transverse cross sections was chosen for investigation. The longitudinal distributions of the transverse cross sectional areas of the model are equal to that of the axisymmetric Body 1 of Reference 1 and the 3:1 elliptical transverse cross-section model of Reference 3. Thus, the three models have the same volume and longitudinal distribution of buoyancy. However, the 2:1 and 3:1 elliptical models have 9% and 23% more wetted surface area, respectively, than the axisymmetric body. The current model has a bow entrance length of 1.667 ft (50.8 cm) and afterbody length of 3.949 ft (120.4 cm). The total model length is 10.06 ft (306.6 cm). The length of parallel middle body is 4.444 ft (135.4 cm). The model has a maximum major axis of 1.296 ft (39.5 cm) and a maximum minor axis of 0.648 ft (19.8 cm). A schematic of the afterbody is shown in Figure 1. The model half-widths along the major and minor axes are shown in Figure 1 as a and b, respectively. The discrete set of offsets used in the theoretical evaluation of the 2:1 model are presented in Table 1.

The 2:1 elliptical model was supported in the wind tunnel by a single strut system. A streamlined strut located 1 ft (30.5 cm) downstream of the after end of the model was attached to a 1.0-in. (2.54-cm)-diam supporting shaft which ran longitudinally through the center of the model. Three streamlined guide wires were attached to the same shaft inside the model at the location x/L = 0.045 (4.5%) from the nose of the model. The model is designed to rotate 90° radially about the internal shaft to permit vertical traversing normal to the surface pressure taps (see next section titled "Instrumentation"). The disturbance generated by the supporting system is not significant. The aft one-half of the model length protruded beyond the closed-jet working section into the open-jet section. The ambient static

pressure coefficients across and along the entire open-jet chamber (7.2 m × 7.2 m × 6.4 m) were found to vary by less than 0.3% of the dynamic pressure. Tunnel blockage and longitudinal pressure gradient effects along the tunnel length were almost completely removed by testing the afterbody in the open-jet section. The model is shown in the Anechoic Wind Tunnel Facility in Figure 2.

The location of the boundary-layer transition from laminar to turbulent flow was artificially induced by a 0.024-in. (0.61-mm)-diam trip wire located at $x/L = 0.05$. Huang et al.[1] found that the trip wire effectively moved the location of the virtual origin to $x/L = 0.015$ for axisymmetric models at a length Reynolds number of 5.9×10^6. The virtual origin[13] for the turbulent flow is defined such that the sum of the laminar frictional drag from the nose to the trip wire, the parasitic drag of the trip wire, and the turbulent frictional drag aft of the trip wire is equal to the sum of the laminar frictional drag from the nose to the virtual origin and the turbulent frictional drag from the virtual origin to the after end of the model. The virtual origin locations for the three-dimensional body are expected to be different for different streamlines. Due to the limited number of grid locations used in the present calculations, the location of flow transition for the C^2K boundary-layer calculation is set at a constant value of $x/L = 0.030$. The computed differences in velocities using $x/L = 0.01$ and $x/L = 0.03$, for axisymmetric body No. 1[1,2] were found to be less than 0.1% of the free-stream velocities in the tail region. Thus, the error of using the constant transition location of $x/L = 0.03$ for the present C^2K computation is expected to be negligible.

INSTRUMENTATION

A series of 0.031-in. (0.8-mm)-diam pressure taps were embedded normal to the surface of the stern at numerous locations. When the model was rotated about its axis, the pressure taps were at the upper meridian location. Additional taps were added for model alignment (see Figure 3). The model was aligned by balancing the surface static pressure about a line of symmetry. From Figure 3, the model is aligned when symmetrically located pressure taps at c and d, and at e and f, give equal pressures, i.e., $p(c) = p(d)$, and $p(e) = p(f)$. The model was rotated to the

test positions and the alignment was checked by the pressure balance technique. A Preston tube using a 0.072-in. (1.83-mm) inside diameter was attached and aligned with the flow at the pressure taps to measure the shear stress. The Preston tube was calibrated in a 1-in. (2.54-cm)-diam water-pipe flow facility described by Huang and von Kerczek.[14] These pressure taps were connected to a multiple pressure scanivalve system that takes one integral pressure transducer with its zeroing circuit and measures a single pressure in sequence along the stern upper meridian. The pressure transducer was designed for measuring low pressures up to 1 psi (6.895×10^{-3} Pa). The zero-drift linearity, scanivalve hysteresis, and pressure transducer zeroing circuit were carefully checked, and the overall accuracy was determined by repeated measurements. The mean pressures measured by the transducers were normalized by the dynamic pressure of the free stream. The mean pressure coefficients of all the Preston tubes and the static tapes on the hull, and of ten randomly selected points across the thick stern boundary layer were measured five different times. The standard deviation of the measured pressure coefficients of all the data were found to be less than 0.005 for the five repeated measurements. Thus, the overall accuracy of the pressure measurements was within 0.5% of the dynamic pressure.

The mean axial and radial velocities and the turbulence intensities for the Reynolds stress calculations were measured by a TSI, Inc., Model 1241-20 "X" type hot-film probe. The probe elements are 0.002 in. (0.05 mm) in diameter with a sensing length of 0.04 in. (1.0 mm). The spacing between the two cross elements is 0.04 in. (1.0 mm). A two-channel hot-wire and hot-film anemometer with linearizers was used to monitor the response of the hot-film probe. A temperature-compensating sensor (probe) was used with each hot-film element to regulate the operating temperature of the sensor with changes in air temperature. The "X" hot film and its temperature-compensated sensor were calibrated together through the expected air temperature range and supplied with their individual linearization polynomial coefficients at the factory.

For reliable measurements, the frequency response of the anemometer system is claimed by the manufacturer to be 0–100 kHz. Calibration of the "X" hot-film probe was made immediately before and after each set of measurements. The maximum

deviation of the hot-film output from the mean linear response curve was held to within 0.5% of the free-stream velocity. In addition, the standard deviation of the hot-film measurements of the free-stream velocity at 150 ft/sec (45.72 m/s) at the reference location were recorded before and after an experimental series and were held to within 0.5%. An estimate was made of the cross-flow velocity by yawing the "X" hot-film probe at the reference free-stream location. It was found that the measured cross-flow velocities were about 1% of the free-stream velocity. At 10 randomly selected points across the thick boundary layer, the streamwise and cross-flow velocity components were measured at five different times. The standard deviations of the streamwise and cross-flow velocity components were found to be less than 1% and 2%, respectively.

The linearized signals were fed into a Time/Data Model 1923-C real-time analyzer. Both channels of the analog signal were digitized at a rate of 128 points per second for 8 seconds. These data were immediately analyzed by a computer to obtain the individual components of mean velocity, turbulence fluctuation, and Reynolds stress on a real-time basis.

A traversing system with a streamlined strut was mounted on a guide plate that permitted the traverse to be locked in various stationary positions parallel to the longitudinal model axis.

EXPERIMENTAL AND DERIVED RESULTS

In the following, the experimental results for the thick stern boundary layer of the 2:1 elliptical cross-section model are presented. The measured pressure distribution is compared with the predictions from the XYZPF computer code,[7] and the measured shear stress distribution is compared with the C^2K[8] predictions. The eddy viscosity and mixing length deduced from the measured data are compared with the thin boundary-layer models of Cebeci and Smith[9] and Bradshaw, et al.,[15] respectively. All comparisons between theory and experiment indicate the need for an adequate representation of the viscous displacement effect due to the thick stern boundary layer. A displacement model technique, similar to that shown valid for axisymmetric

models,[1,2] is required to properly predict three-dimensional thick stern boundary layers. Efficient computational methods for the viscous/inviscid interaction of the general three-dimensional boundary layers are under intensive development at DTNSRDC and elsewhere.

All data are presented in the coordinate system used to experimentally measure the boundary-layer flows. The coordinate system, denoted by x-n_e-θ, is given in Figures 1 and 3. The axial coordinate x is measured from the nose of the body and passes through the center of the elliptic profile. The coordinates n_e and θ are defined along an axial cut normal to the x axis, i.e., in the yz plane. The normal component n_e is measured from the model surface and is normal to the elliptic surface, but not to the model as a whole. The angular coordinate θ is defined as the angle, in degrees, measured from the z-minor axis to the line joining the surface offset and elliptic center.

PRESSURE DISTRIBUTIONS

The steady pressure was measured along the stern surface using pressure taps embedded in the surface. These taps are located at ten axial and seven angular positions, for a total of 70 measurements. The pressure coefficient C_p is computed from the measured pressures by the relationship

$$C_p = \frac{p-p_o}{p_t-p_s} = \frac{p-p_o}{(1/2)\rho U_o^2}$$

where p = measured local static pressure

p_o = measured ambient pressure

p_t = measured dynamic total pressure

p_s = measured static pressure

ρ = mass density of the fluid

U_o = free-stream velocity

The measured values of the pressure coefficients are given in Table 2 and compared in Figure 4 with the predicted distributions from the XYZPF[7] code using the preliminiary potential-flow C_p distribution of the original body without considering viscous/inviscid interaction. In Figure 4, the circles represent the measured data, and the solid curve shows the potential flow predictions. The computed coefficient is

$$C_p = 1 - (U_e/U_o)^2$$

where U_e is the computed potential flow velocity and U_o is the free-stream velocity of 100 ft/sec (30.48 m/s).

Figure 4 shows that the predicted pressure coefficient agrees well with the measurements for the 0° and 45° planes. As the angle is increased, the agreement between theory and experiment is still good for $x/L \leq 0.85$. However, the predictions become increasingly worse as the angle is increased for $x/L > 0.85$. In this region, the boundary-layer displacement effect on pressure becomes increasingly important. These results confirm the need for additional viscous/inviscid interaction treatment in the turbulent thick stern-boundary-layer region.

SHEAR STRESS DISTRIBUTIONS

Readings from a Preston tube, taped to the stern surface at the pressure tap locations, were used in conjunction with the steady pressure readings to obtain the shear stress distribution at the body surface. The wall shear stress τ_w was computed using the Huang-von Kerczek[14] calibration curve in a pipe. The shear stress coefficient C_τ is given by

$$C_\tau = \frac{\tau_w}{p_t - p_s}\left(\frac{U_o}{U_e}\right)^2$$

for the measured shear stress, and by

$$C_\tau = \tau_w/(1/2)\ \rho U_e^2$$

for the analytical shear stress.

Figure 5 shows a comparison of the measured and theoretical values of the shear stress coefficient. The analytical values are determined in the C^2K[8] computer code. The predicted location of separation at each angular position is noted on the graphs in Figure 5, and the solid line ends at separation. Additionally, the dashed lines, indicating predictions made in the separated region, show that calculations in this region are in error. Agreement is reasonable for the 0°, 45°, and 67° angles. Except at 90°, agreement is reasonable for $x/L \leq 0.85$. The measured values of C_τ are tabulated in Table 3.

STATIC PRESSURE DISTRIBUTIONS

The measured static pressure coefficients for the 2:1 elliptical model are shown in Figure 6 for various axial locations and angular positions across the stern boundary layer. The off-body option of the XYZ potential flow computer code[7] may be used to compute the static pressure distributions for the actual displacement body. The measured static pressure coefficients are summarized in Table 4.

MEAN VELOCITY

Mean velocity and turbulence measurements were taken with an "X" hot-film sensor which was stepped away from the body in the n_e direction. Measurements of velocity in the axial x and normal n_e directions, u_x and v_n, respectively, were taken with the probe elements aligned vertically. The sensor elements were rotated 90° to the horizontal position to measure the mean velocity w_θ in the θ direction. An on-line computer was used to collect data at a sample rate of 1024 data values in 8 sec. The root-mean-square values of turbulence velocity were recorded at each probe position, and the eddy viscosity and mixing length values were computed from the measured Reynolds stresses and the measured mean velocity profiles.

Figure 7 shows the measured mean velocity profiles across the stern of the 2:1 elliptic model. For a given axial location, mean velocity components normalized by the free-stream velocity U_o are given in the x, n_e, and θ directions for varying angular positions. The normal and angular velocity components, which are nearly zero up to the last 15% of the body length, show a small inflow towards the body surface in the aft region of the body. Figure 7f shows that this three-dimensional effect has nearly disappeared in the near wake at x/L = 1.065, with the angular and normal velocity components again remaining fairly constant at a value of zero. Little angular variation is noted in the axial velocity component u_x/U_o forward of x/L = 0.858. From this location aft, the boundary layer thickens with increased angular position. Figure 8 shows a comparison of the measured and predicted mean velocity profiles (with no viscous/inviscid interaction) at three locations on the 2:1 model. As exemplified in Figure 8a, the agreement between measured and predicted profiles is excellent along θ = 0° for the entire model length. The agreement is still reasonable up to θ = 73° in the stern region, as illustrated by the comparison in Figure 8b at θ = 67° for x/L = 0.944. However, over the corner region of the major axis (θ = 90°), the surface curvatures are small and undergo rapid change. The thin-boundary-layer equations are not good approximations of the flow in this corner region. The poor agreement between theory and measurement over the major axis region occurs as far forward as x/L = 0.894, as shown in Figure 8c. Unlike the profiles on the 3:1 elliptic model,[3] which showed little variation in the profiles of angles less than or equal to 80°, all profiles are shown to thicken as the angular position increases. This phenomenon suggests that the 2:1 model is not influenced as much as the 3:1 model by the strong body curvatures near the 90° position. The more gentle curvature of the 2:1 cross section is reflected in the mean-velocity distribution. From repeated measurements, the accuracies of the experimental measurements of u_x/U_o and v_n/U_o are estimated to be about 0.5% and 1.0%, respectively. All measured values of the mean velocity components are given in Tables 5-10.

REYNOLDS STRESSES

The distribution of the Reynolds stresses $\overline{-u_x'v_n'}$, $\overline{-u_x'w_\theta'}$, $\overline{(u_x')^2}$, $\overline{(v_n')^2}$, and $\overline{(w_\theta')^2}$ represent the turbulence characteristics in the thick boundary layer. The mean-square turbulent velocity fluctuations $\overline{(u_x')^2}$ in the axial direction and $\overline{(v_n')^2}$ in the n_e direction, and the Reynolds stress $\overline{-u_x'v_n'}$ were measured with the "X" hot-film probe elements aligned vertically. The probe elements were rotated 90° to the horizontal position to measure both the turbulent fluctuation $\overline{(w_\theta')^2}$ in the θ direction and the Reynolds stress $\overline{-u_x'w_\theta'}$. Linear interpolation was used to approximate $\overline{(w_\theta')^2}$ and $\overline{-u_x'w_\theta'}$ at the same off-body positions as the data measured in the vertical direction. All measured values of turbulent fluctuations and the measured Reynolds stresses are given in Tables 5-10.

Since the measured velocity fluctuations and Reynolds stresses exhibit similar trends at each location, plots of their distributions are not included. Instead, reference is made to Tables 5-10 for the following discussion of the properties of these data measurements. The axial component $\overline{(u_x')^2}/U_o$ is the largest component of turbulent velocity fluctuation, and the normal component $\overline{(v_n')^2}/U_o$ is the smallest component. In addition, the fluctuations are larger near the body's surface and reduce to values near zero as the edge of the boundary layer is approached. At the body's surface, the no-slip boundary condition requires the velocity and turbulent fluctuations to be zero, indicating that a sharp gradient exists in the turbulent fluctuations at the wall. This gradient, which becomes apparent in the measured data as the boundary layer thickens, is evident at all angular locations where $x/L \geq 0.914$. Similar trends have been noted by Huang et al.[1,2] for axisymmetric bodies and by Groves et al.[3] for a 3:1 elliptical transverse cross-section model.

The measured Reynolds stresses on the 2:1 model also exhibit behavior similar to that reported by Groves et al.[3] on the 3:1 model. The Reynolds stress $\overline{-u_x'w_\theta'}$ is typically one order of magnitude less than the Reynolds stress $\overline{-u_x'v_n'}$. The maximum value of the larger Reynolds stress occurs near the body wall showing little variation with location along the model.

EDDY VISCOSITY AND MIXING LENGTH

The solutions of the time-dependent, three-dimensional, Navier-Stokes equations with adequate resolution of time and spatial scales by today's computers are limited to laminar flows at very low Reynolds numbers. The time-averaged Navier-Stokes equations are often used to compute the mean flow quantities at high Reynolds numbers, but the time-dependent solutions are then sacrificed. The simplified time-averaged Reynolds equations required a set of closure relationships for Reynolds stresses. The closure relationship reduces the number of unknowns to the number of equations. The common approach to closure is to define an eddy viscosity (an artifice) for turbulent flows in the same form as the laminar viscosity in the stress tensor for the Newtonian flows. The specification of the eddy viscosity in terms of algebraic or differential equations has been the major area of turbulence research for the past 15 years. Some of these turbulence modelings are successful for thin boundary layer and for simple flows, but none of the closure relationships is universally superior for all complex flows. Therefore, Kline[16] in his summary of the 1980-81 Stanford Conference emphasized the importance of developing "zonal models" for various structural flow zones. Thick turbulent stern flows possess a special similarity flow structure which differs from that of the thin boundary layers. These distinct "zonal" characteristics of turbulent stern flows are demonstrated in the following.

The values of eddy viscosity and mixing length are not measured directly but are obtained, as in previous studies,[1-3] from the measured values of the Reynolds stress $\overline{-u_x'v_n'}$ and the mean velocity gradient $\partial u_x/\partial n_e$. The definitions used to compute these quantities are

$$\begin{aligned}\overline{-u_x'v_n'} &= \varepsilon \frac{\partial u_x}{\partial n_e} \\ &= \ell^2 \left[\left(\frac{\partial u_x}{\partial n_e}\right)^2 + \left(\frac{\partial w_\theta}{\partial n_e}\right)^2 + 2\left(\frac{\partial u_x}{\partial n_e}\right)\left(\frac{\partial w_\theta}{\partial n_e}\right) \cos \overline{\theta}\right]^{1/2} \frac{\partial u_x}{\partial n_e} \qquad (1)\end{aligned}$$

When the values of w_θ/u_x are less than 0.1 and the value of $\overline{\theta}$ is 90° for the present measurements, Equation (1) may be approximated by

$$\overline{u_x v_n} = \ell^2 \left|\frac{\partial u_x}{\partial n_e}\right| \frac{\partial u_x}{\partial n_e} \tag{2}$$

A spline curve is used to fair the experimental data before the velocity gradient is obtained numerically.

The nondimensional distributions of the eddy viscosity $\varepsilon/(U_\delta \delta_p^*)$, determined from the data, are shown in Figure 9. The parameters U_δ and δ_p^* are defined as the potential flow velocity at the edge of the boundary layer and the planar displacement thickness, respectively, for the displacement body. The solid curve shown in these figures is the Cebeci and Smith[9] thin-boundary-layer formula given by

$$\frac{\varepsilon}{U_\delta \delta_p^*} = \frac{0.0168}{1 + 5.5\left(\frac{n_e}{\delta_r}\right)^6} \tag{3}$$

All values of eddy viscosity for the 2:1 elliptic model are smaller than the experimentally derived values recommended by Cebeci and Smith for thin boundary layers.

The experimentally determined distributions of the nondimensional mixing length ℓ_p/δ_r are shown in Figure 10. The solid curve in this figure represents the thin-boundary-layer model of Bradshaw et al.[15] The measured values of mixing length are generally much smaller than the predictions.

For a thick, axisymmetric, turbulent boundary layer, Huang et al.[1,2] proposed a turbulence model relating the mixing length to the square root of the entire turbulence annulus area between the body surface and the edge of the boundary layer. Groves et al.[3] developed a similar mixing length model for a thick, three-dimensional, stern boundary layer and showed satisfactory results for three axisymmetric models and for the 3:1 elliptic model. The mixing length assumed is

$$\ell \sim \sqrt{(a+0.6\delta_a)(b+0.6\delta_b) - ab} \equiv A(x)$$

where a and b are the major and minor elliptic axes, respectively, and δ_a and δ_b are the boundary-layer thicknesses along the a and b axes. The values of ℓ/A at various

locations for the present 2:1 elliptic model are shown in Figure 11. As found with the previous models, values of the nondimensional mixing length remain fairly constant over the stern with respect to angular and axial positions.

These results provide further evidence to support the use of a revised mixing length formulation. Work is presently in progress at DTNSRDC to develop a new analytical model. The experimental data on the axisymmetric[1,2] and 2:1 and 3:1[3] three-dimensional models will provide a fundamental data base for evaluating this and other analytical models for turbulent, thick, stern boundary-layer flow.

CONCLUSIONS

The results of recent experimental investigations of the thick stern boundary layer on a simple three-dimensional body having 2:1 elliptical transverse cross sections are presented. Comprehensive boundary layer measurements, including mean velocity and Reynolds stress profiles, shear stress distributions, and static pressure distributions are given in detail. The derived values of eddy viscosity and mixing length are obtained from the measured values of Reynolds stress and the mean velocity gradient.

The preliminary boundary-layer computations were made by using the original potential-flow pressure distributions without considering viscous/inviscid interaction. Theoretical predictions of the measured mean axial velocity profiles are satisfactory in the thin-boundary-layer region, but are generally larger than the measured values when the boundary layer thickens in the stern region along the major axis of the transverse cross section. An efficient computer program capable of determining accurate viscous/inviscid interaction over the entire stern region and wake is needed. This set of complete experimental boundary-layer data for a simple three-dimensional body can readily be used to verify computational methods.

Derived values of eddy viscosity and mixing length from the measured values of Reynolds stress and mean velocity gradient in the thick stern boundary layer were found to be smaller than values which have been proposed for thin boundary layers. Because eddy viscosity and mixing length models play an important role in boundary-layer calculations, a modification of the theoretical mixing length model is proposed

which will improve the prediction of the boundary layer and may be used as initial input to the more sophisticated turbulence modeling. In the new model, the mixing length parameter is assumed to be proportional to the square root of an effective transverse turbulence area.

ACKNOWLEDGMENTS

The authors wish to thank the staff at the DTNSRDC Anechoic Flow Facility for their cooperation during the testing. We also wish to express our gratitude to Ms. Anne M. Oetting for her assistance during the test and the data reduction and presentation.

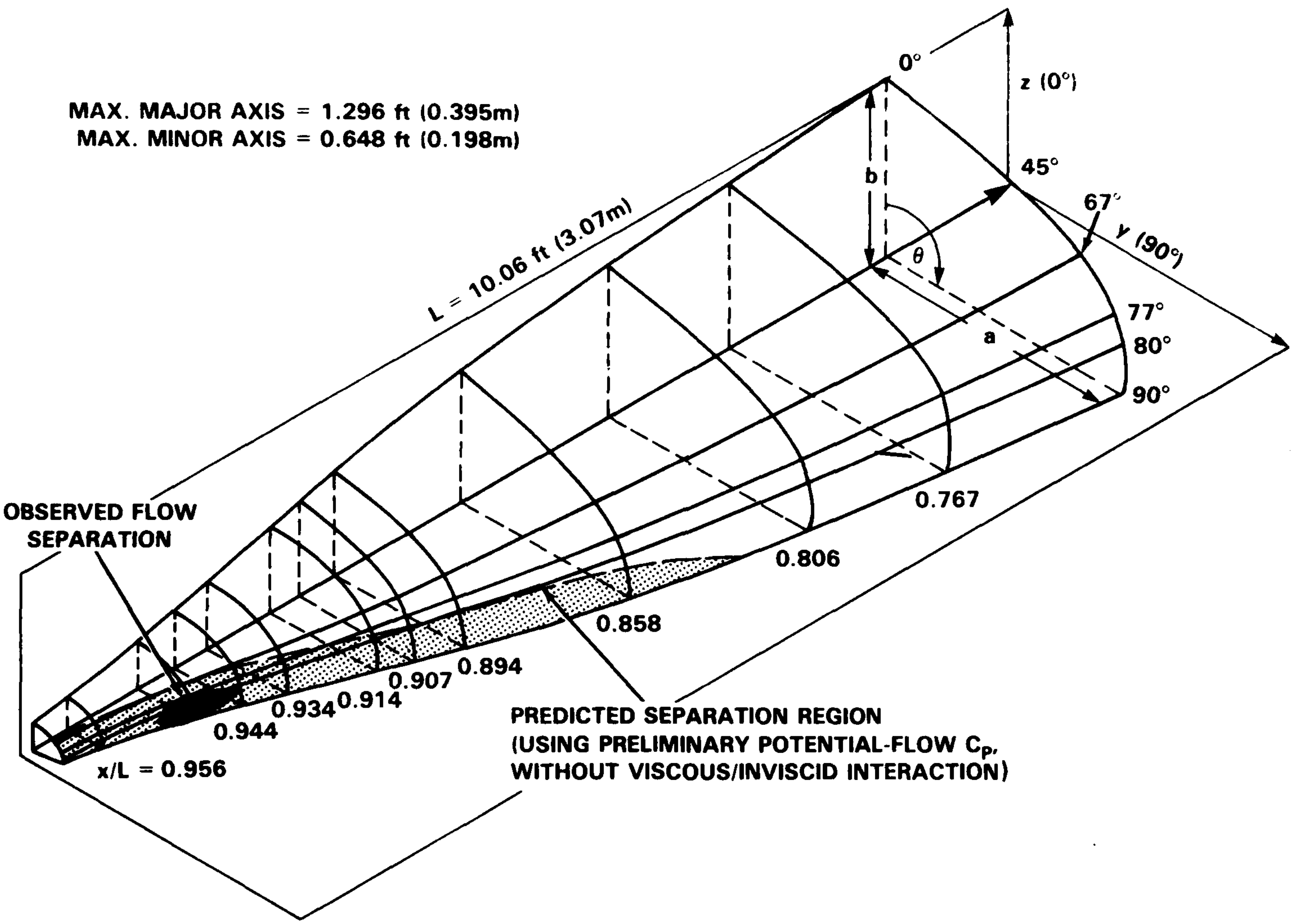


Figure 1 - Schematic of the Three-Dimensional Afterbody Having 2:1 Elliptic Transverse Cross Sections

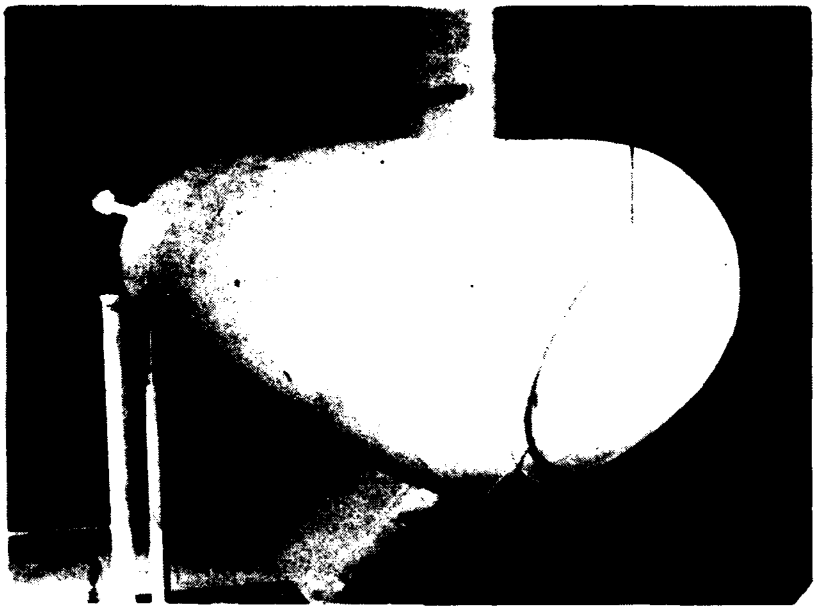


Figure 2 - The 2:1 Elliptical Model Mounted in an Anechoic Wind Tunnel

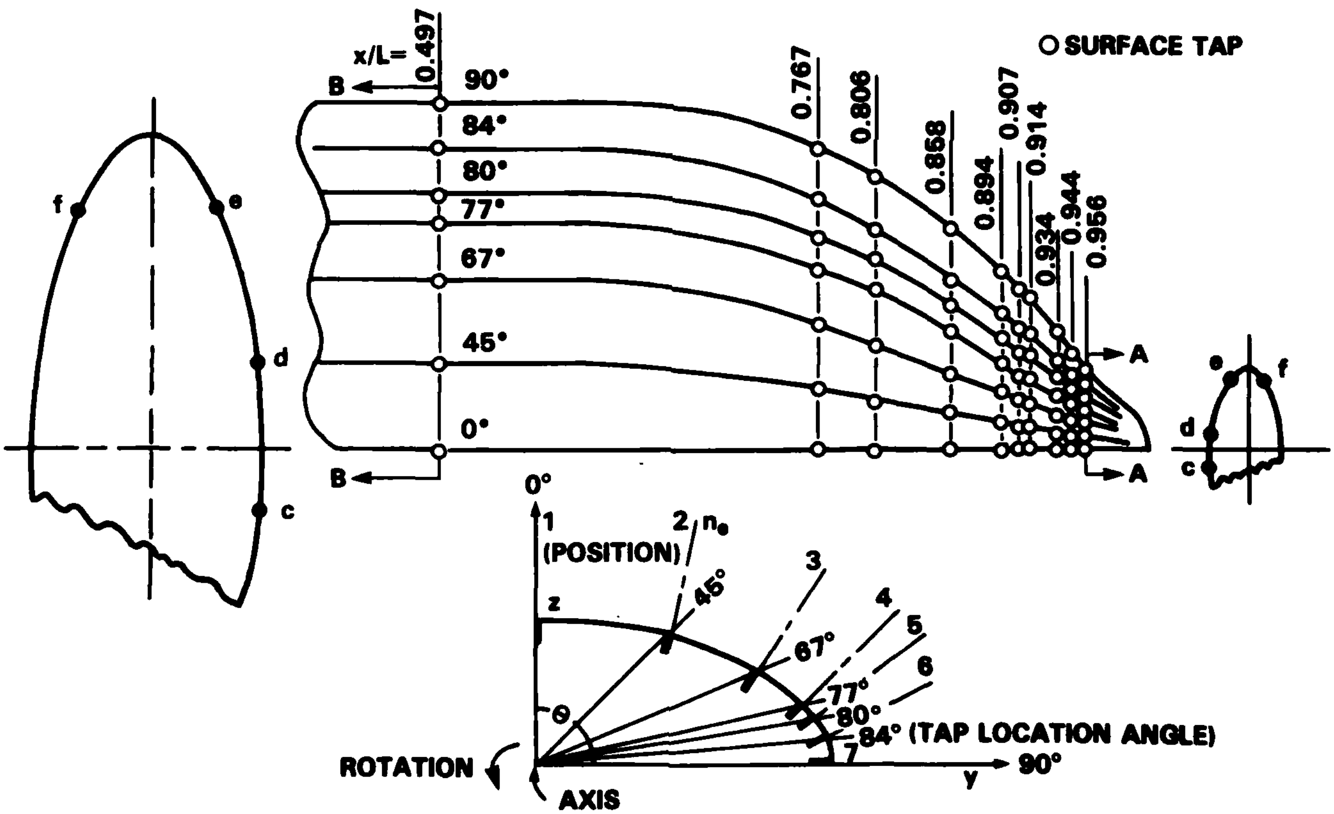


Figure 3 - Schematic of Surface Pressure Taps on the 2:1 Elliptical Model

Figure 4 - Computed and Measured Stern Pressure Distributions

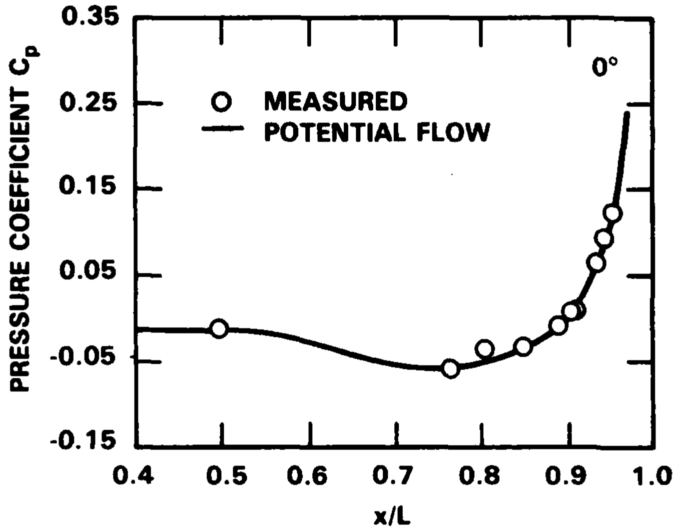


Figure 4a

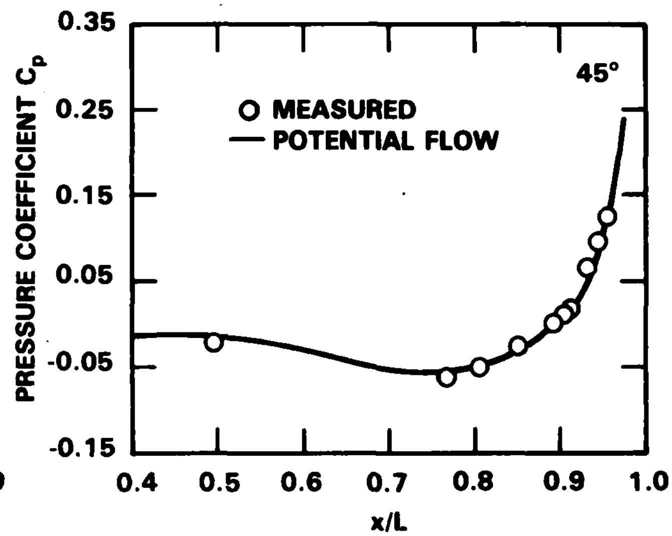


Figure 4b

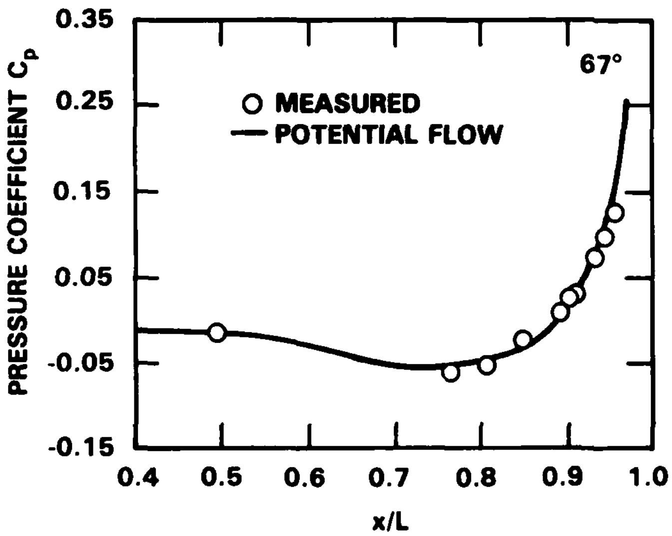


Figure 4c

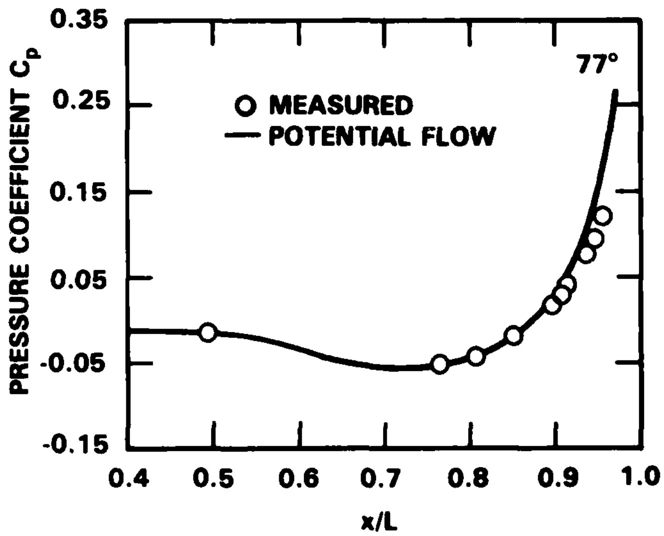


Figure 4d

Figure 4 (Continued)

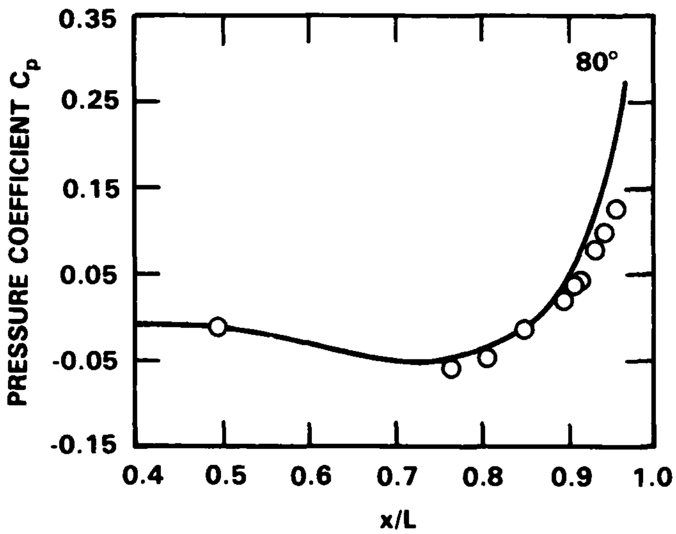


Figure 4e

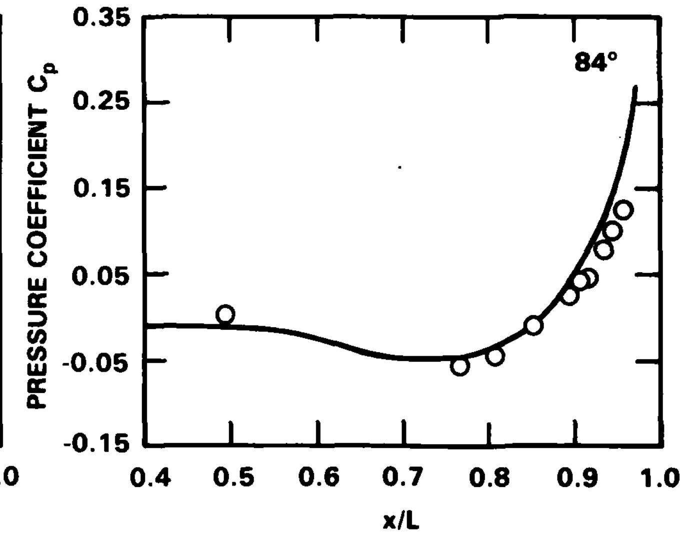


Figure 4f

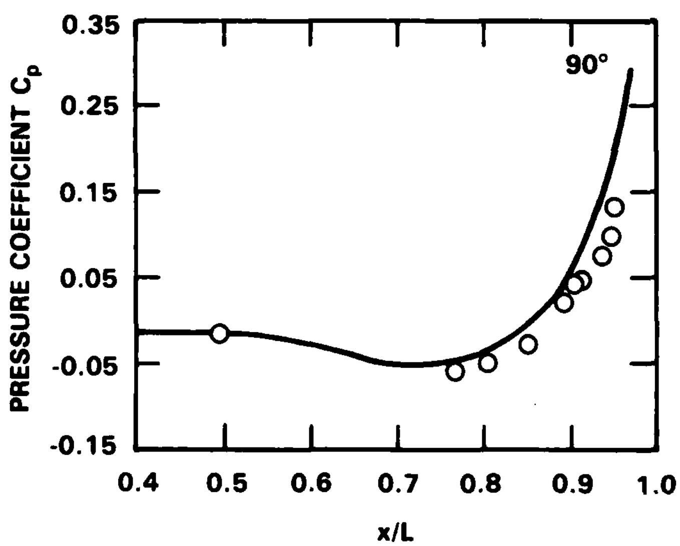


Figure 4g

Figure 5 - Computed and Measured Stern Shear Stress Distributions

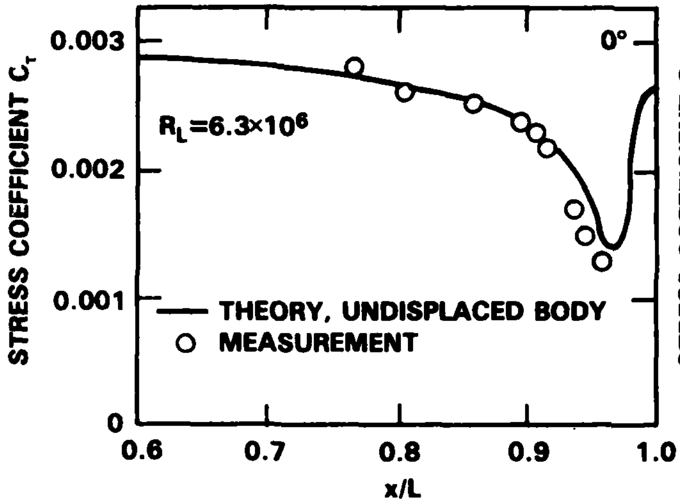


Figure 5a

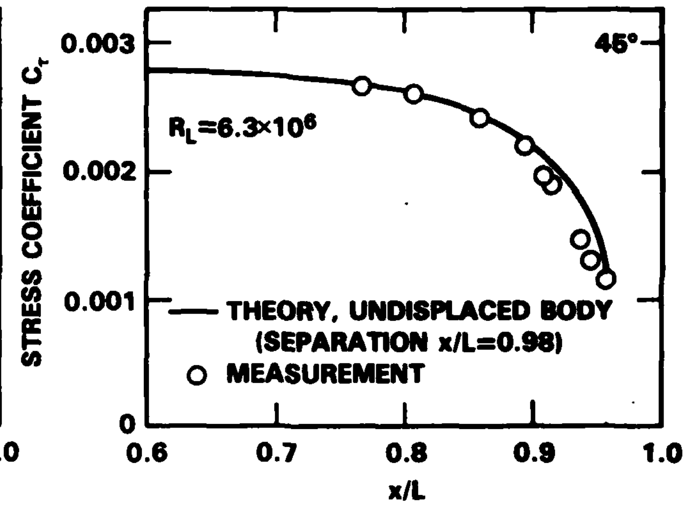


Figure 5b

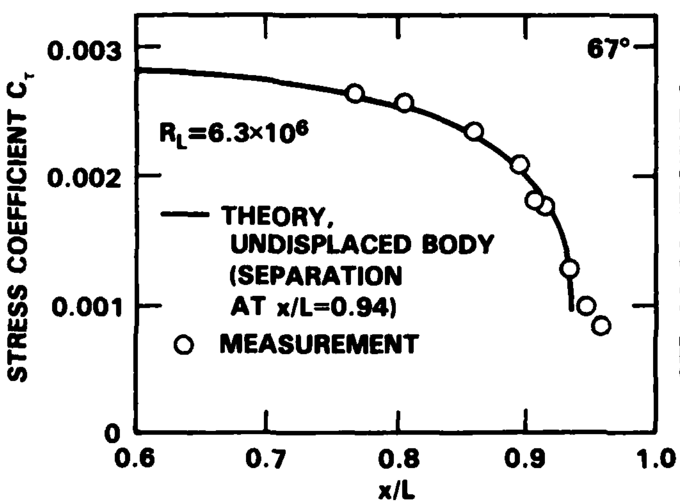


Figure 5c

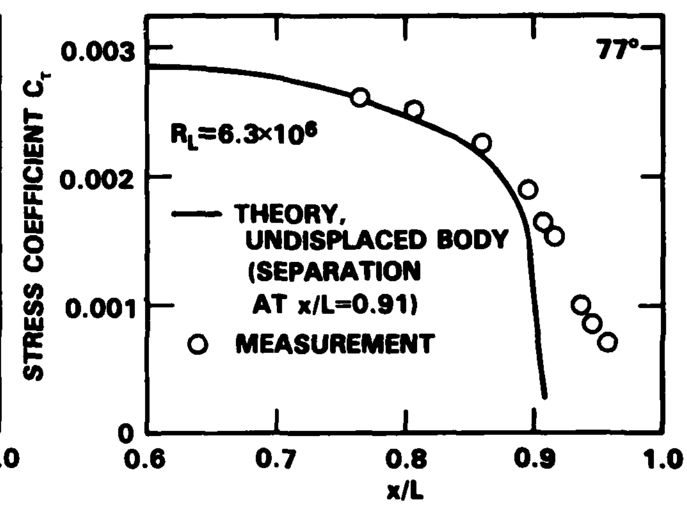
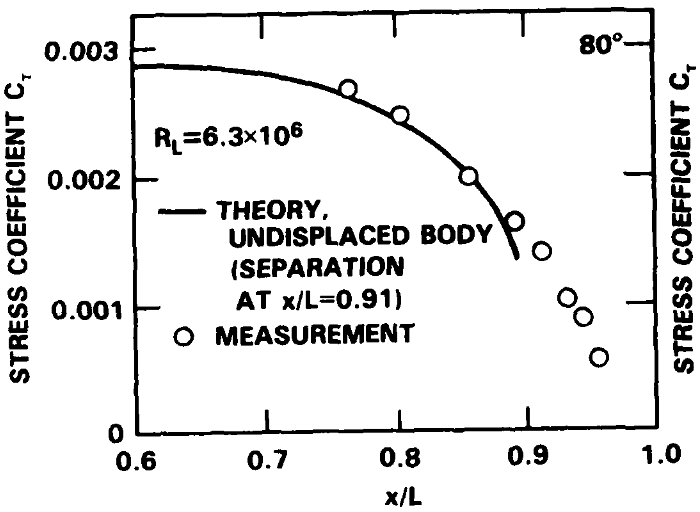


Figure 5d

Figure 5 (Continued)



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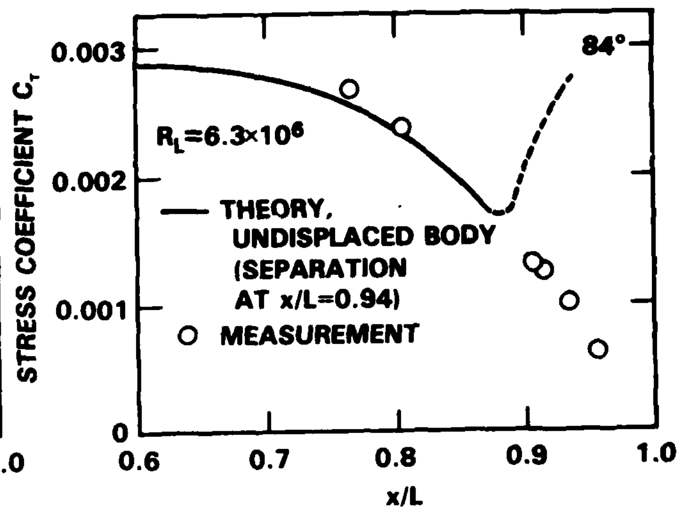

Figure 5f

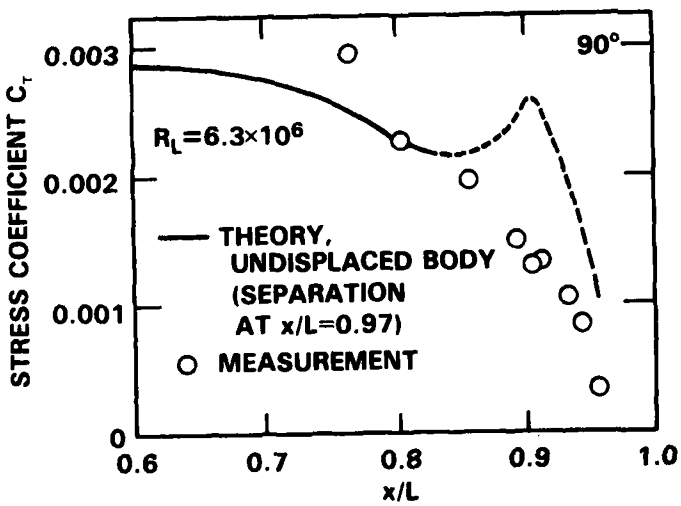

Figure 5g

Figure 6 - Measured Static Pressure Distributions for Several Values of x/L

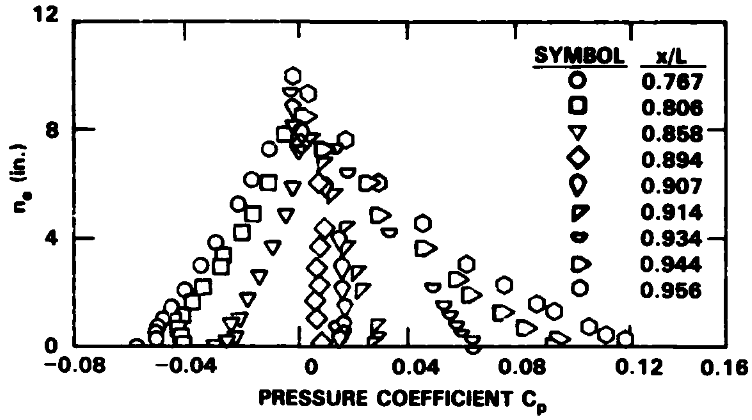

Figure 6a - 0 Degree

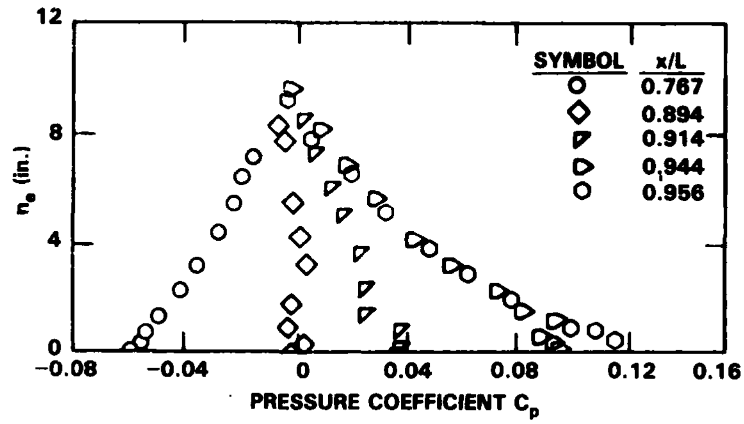

Figure 6b - 67 Degree

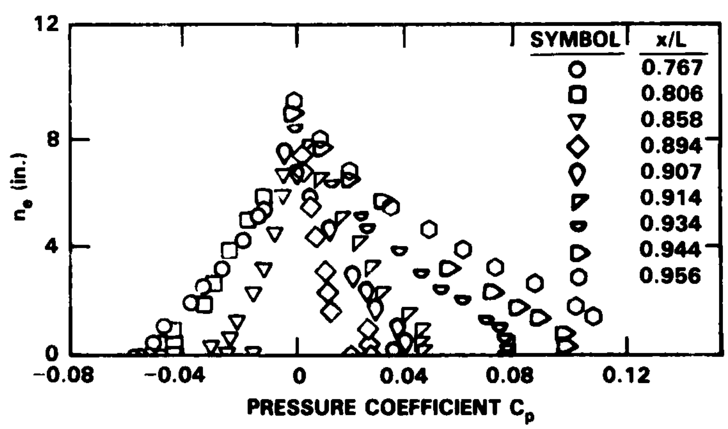

Figure 6c - 80 Degree

Figure 6 (Continued)

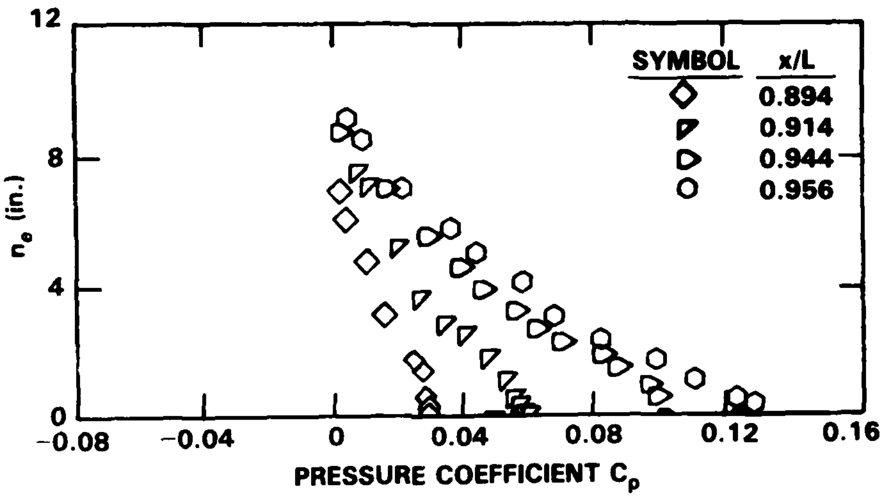

Figure 6d - 84 Degree

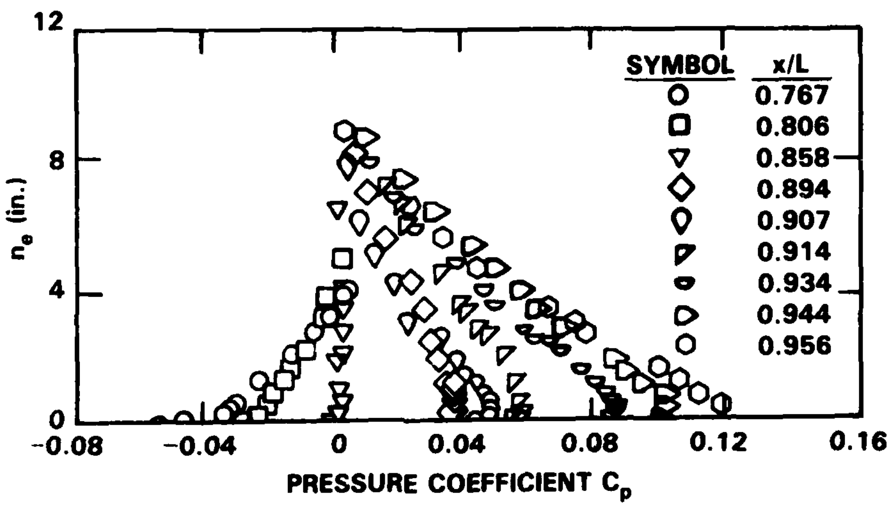

Figure 6e - 90 Degree

Figure 7 - Measured Mean Axial, Radial, and Angular Velocity Distributions

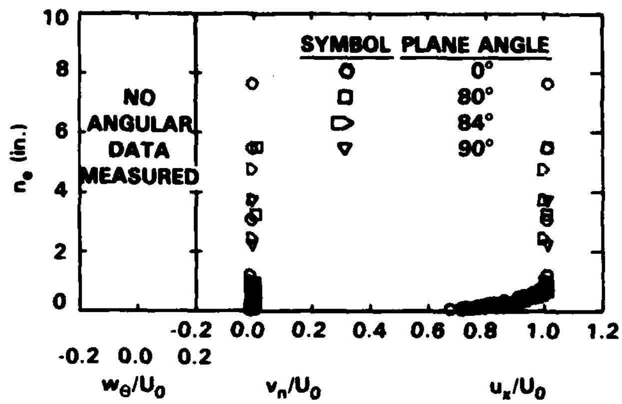

Figure 7a - x/L = 0.497

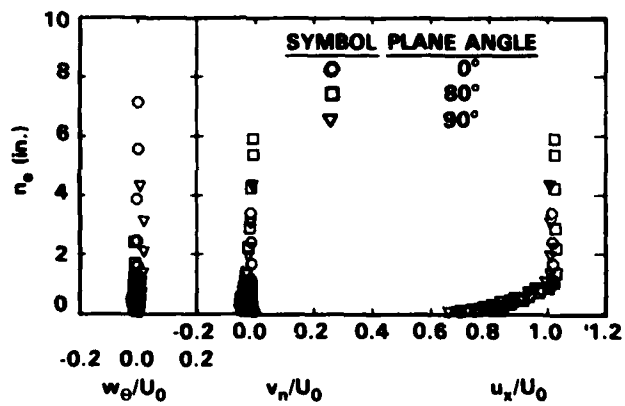

Figure 7b - x/L = 0.767

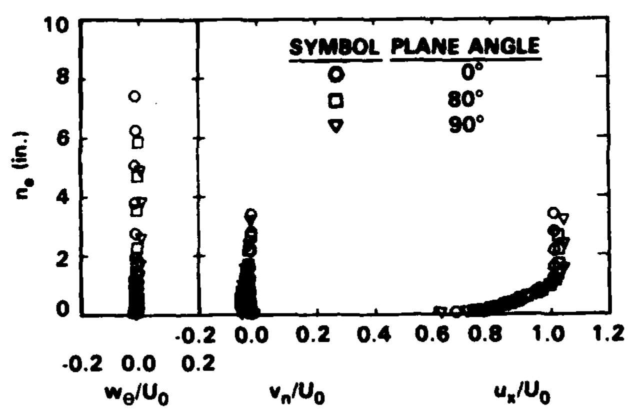

Figure 7c - x/L = 0.806

Figure 7 (Continued)

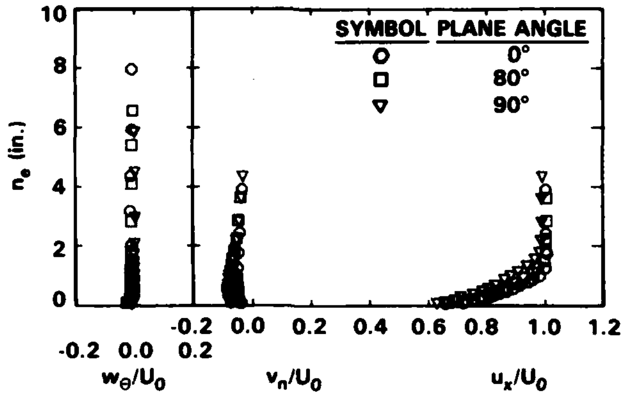

Figure 7d - x/L = 0.858

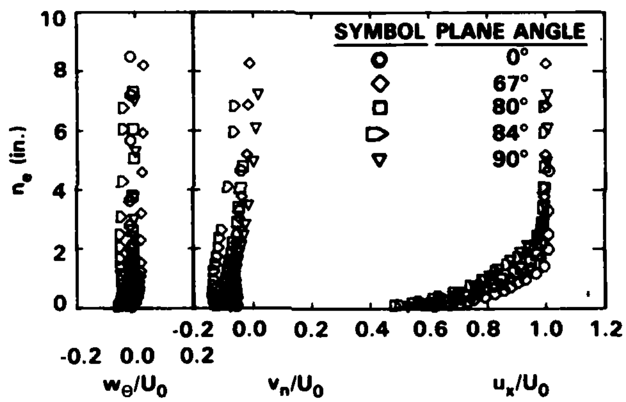

Figure 7e - x/L = 0.894

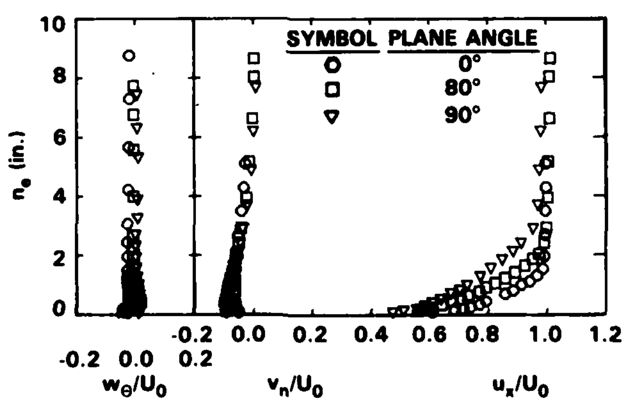

Figure 7f - x/L = 0.907

Figure 7 (Continued)

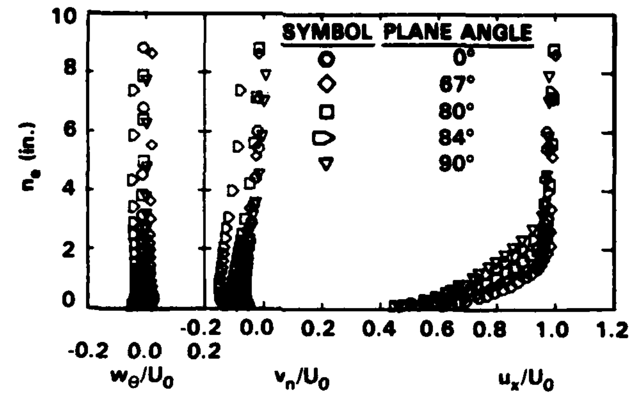

Figure 7g - x/L = 0.914

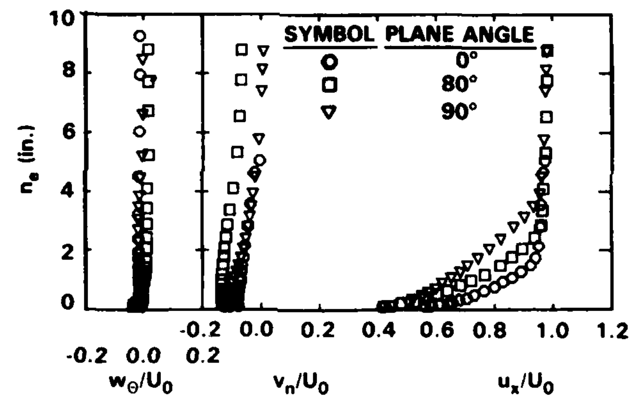

Figure 7h - x/L = 0.934

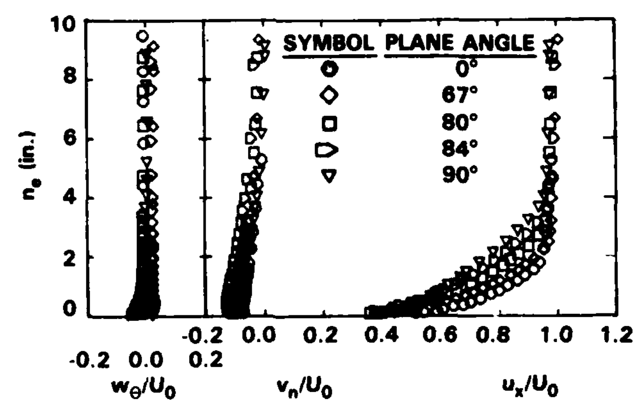

Figure 7i - x/L = 0.944

Figure 7 (Continued)

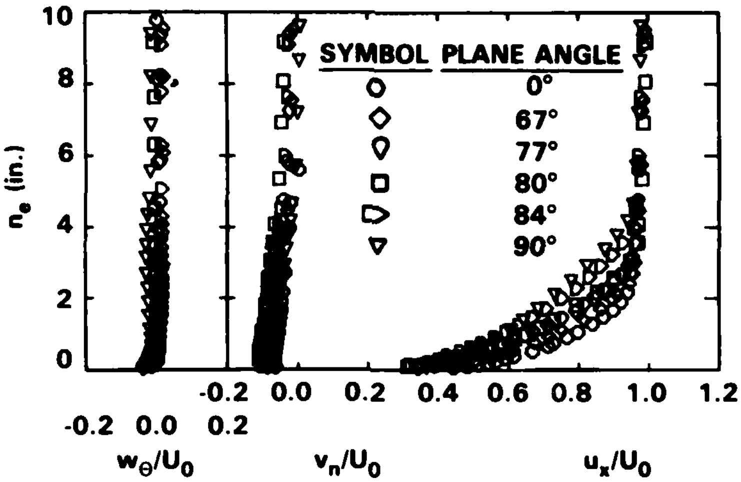

Figure 7j - x/L = 0.956

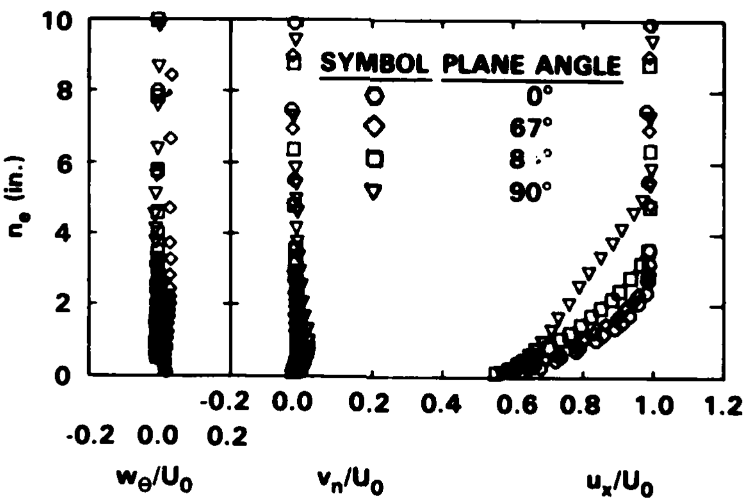

Figure 7k - x/L = 1.065

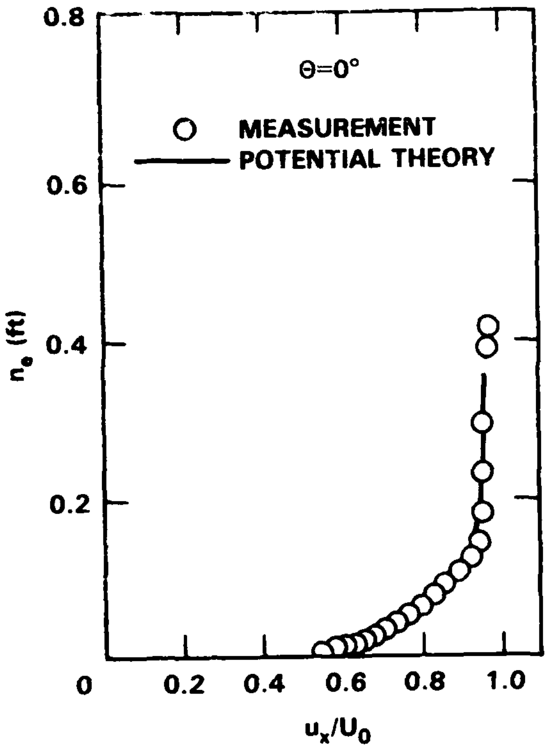

Figure 8a - x/L = 0.934

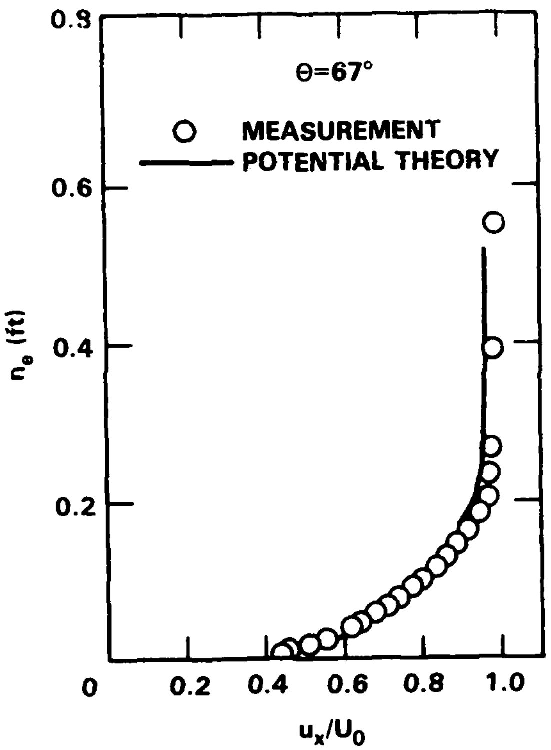

Figure 8b - x/L = 0.944

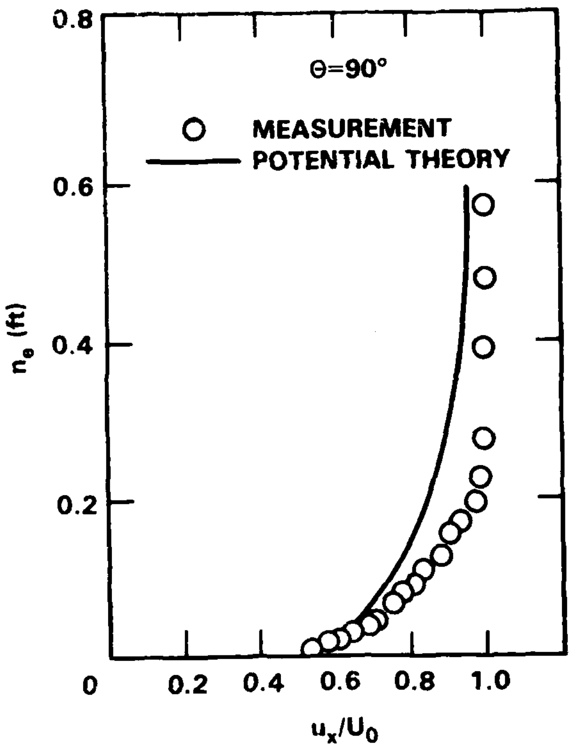

Figure 8c - x/L = 0.894

Figure 8 - Computed and Measured Mean Axial Velocity Distributions

Figure 9 - Measured Distributions of Eddy Viscosity

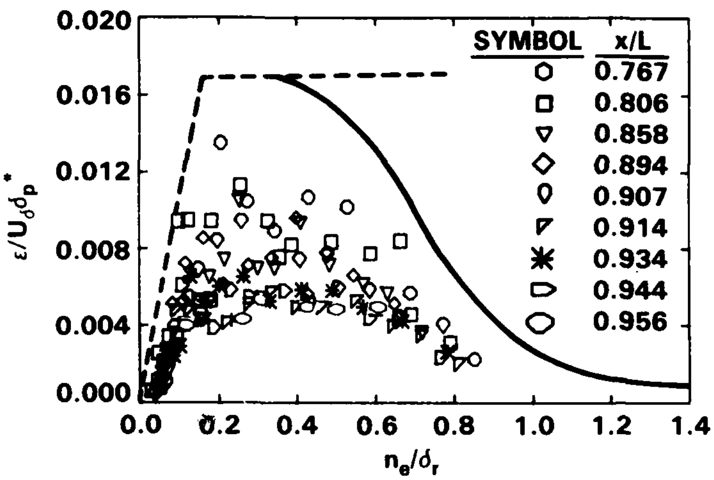

Figure 9a - 0 Degree

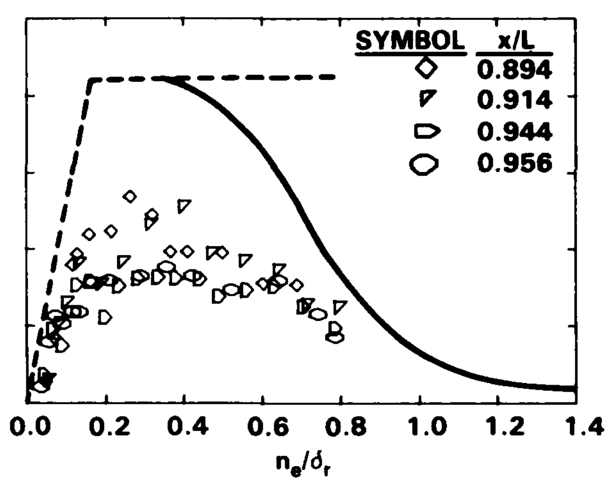

Figure 9b - 67 Degree

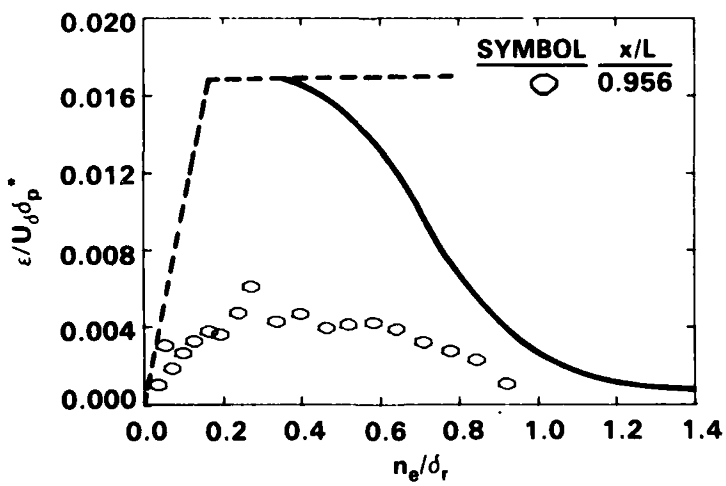

Figure 9c - 77 Degree

Figure 9 (Continued)

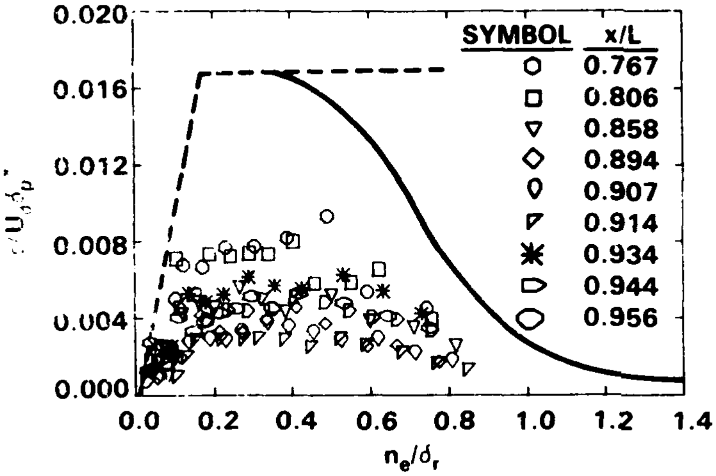

Figure 9d - 80 Degree

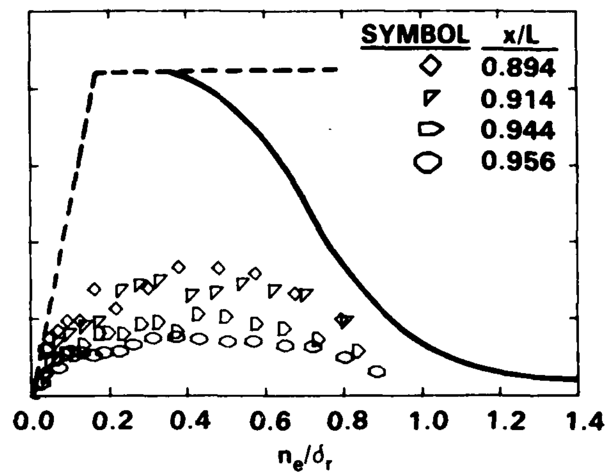

Figure 9e - 84 Degree

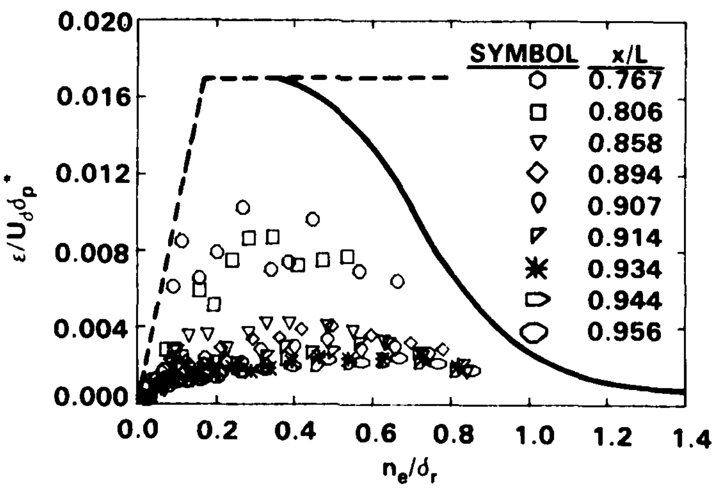

Figure 9f - 90 Degree

Figure 10 - Measured Distributions of Mixing Length

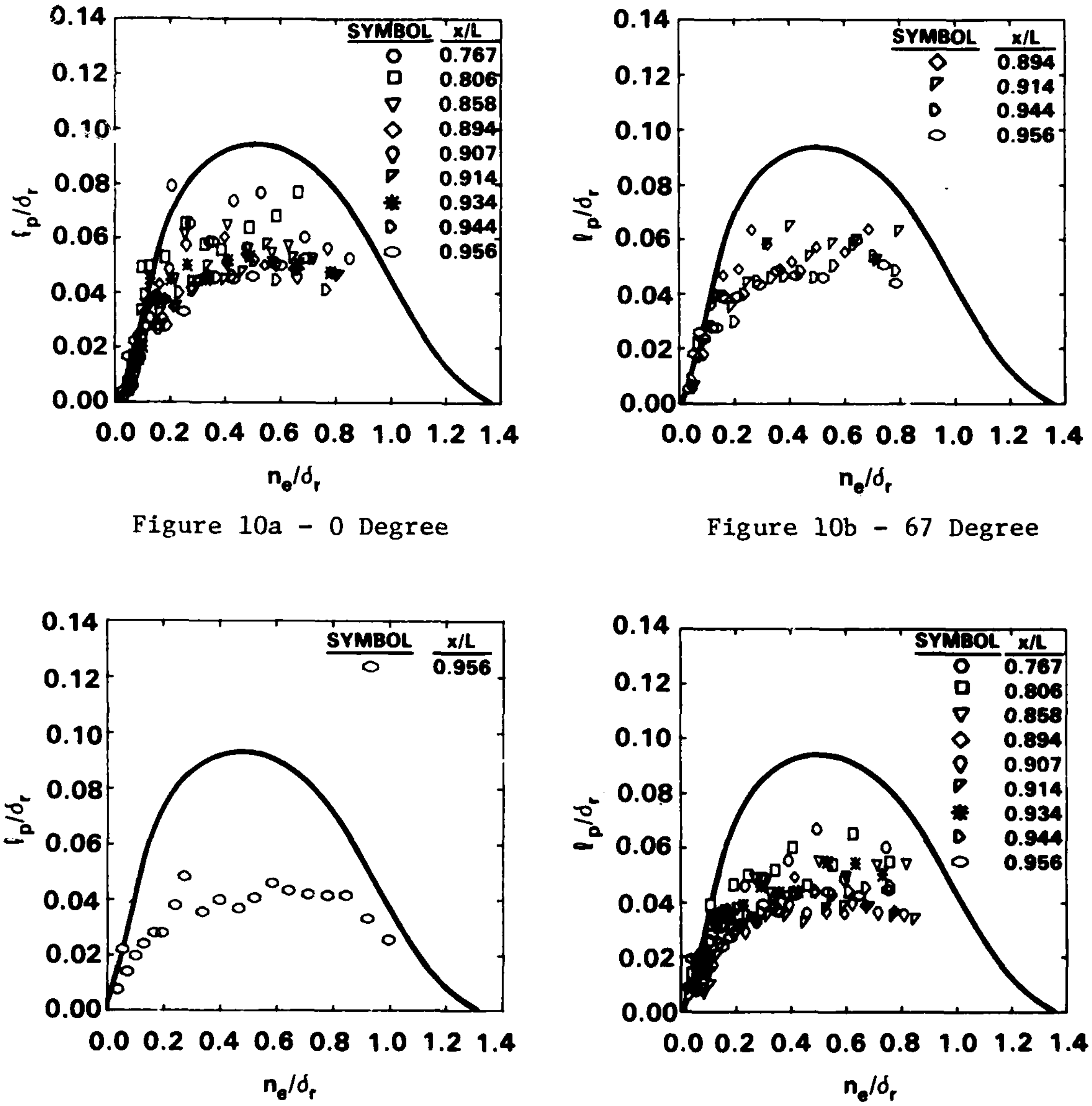

Figure 10a - 0 Degree

Figure 10b - 67 Degree

Figure 10c - 77 Degree

Figure 10d - 80 Degree

Figure 10 (Continued)

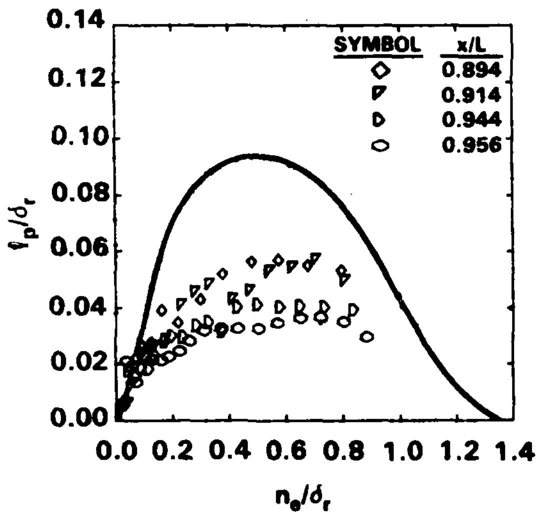

Figure 10e - 84 Degree

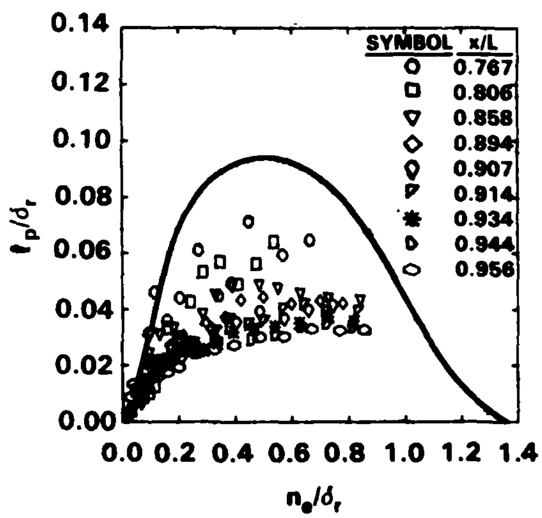

Figure 10f - 90 Degree

Figure 11 - Proposed Similarity Concept for Mixing Length of Turbulent Boundary Layer

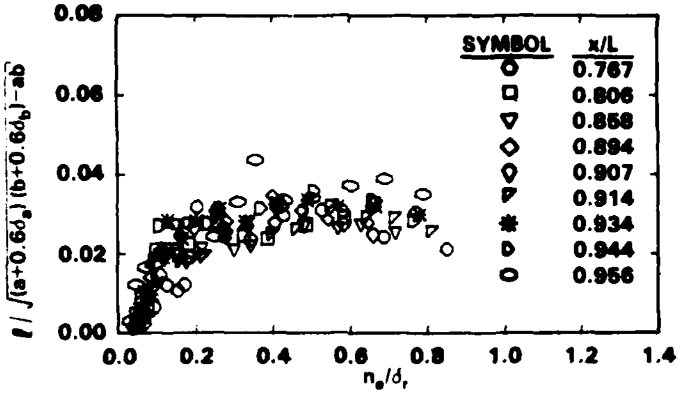

Figure 11a - 0 Degree

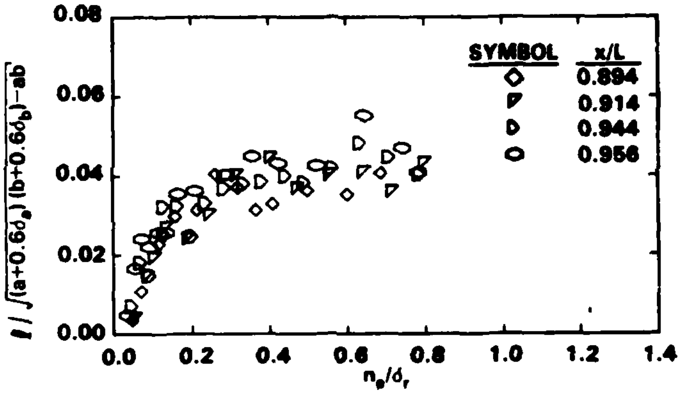

Figure 11b - 67 Degree

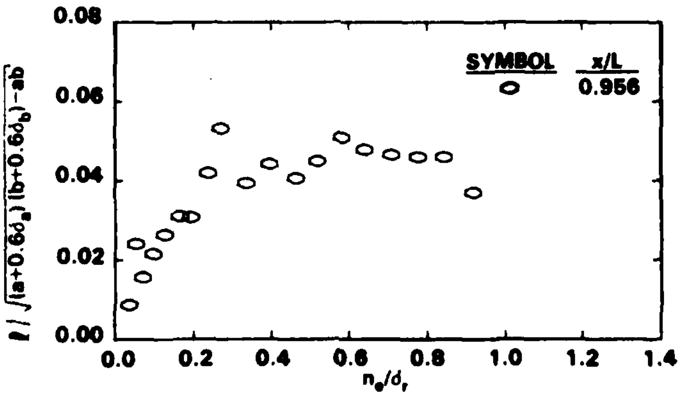

Figure 11c - 77 Degree

Figure 11 (Continued)

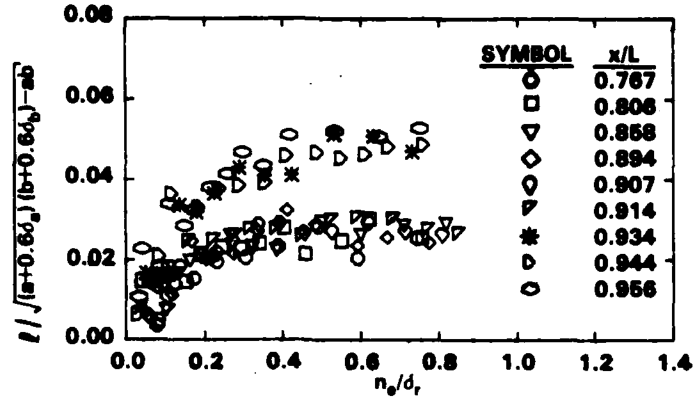

Figure 11d - 80 Degree

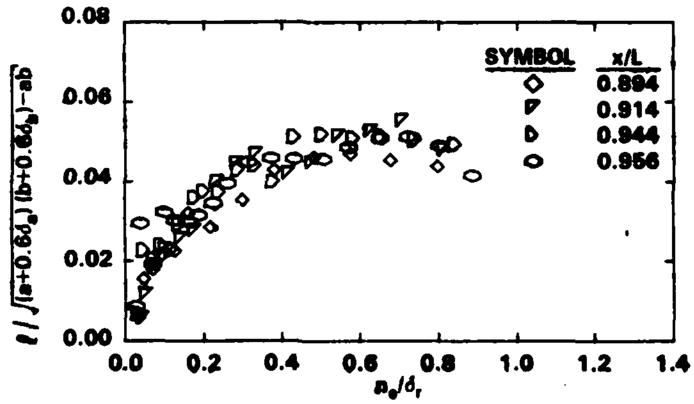

Figure 11e - 84 Degree

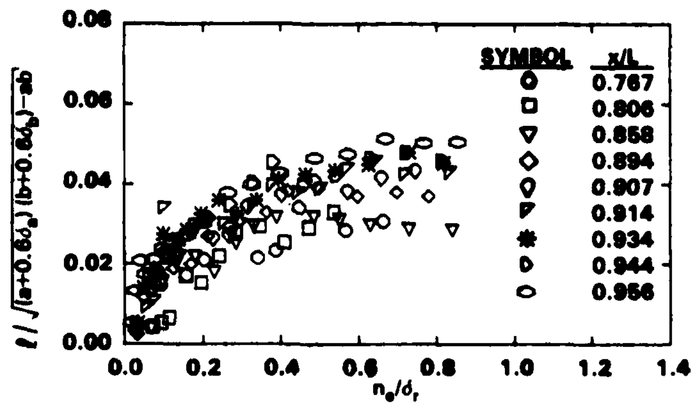

Figure 11f - 90 Degree

TABLE 1 - MODEL OFFSETS (ALL NUMBERS IN FEET)

X	Y	Z	X	Y	Z
0.00000	0.00000	0.00000	-0.20000	0.23030	-0.08636
0.00000	0.00000	0.00000	-0.20000	0.25909	-0.06274
0.00000	0.00000	0.00000	-0.20000	0.27809	-0.03721
0.00000	0.00000	0.00000	-0.20000	0.28768	0.00000
0.00000	0.00000	0.00000	-0.25000	0.00000	-0.16123
0.00000	0.00000	0.00000	-0.25000	0.02902	-0.16058
0.00000	0.00000	0.00000	-0.25000	0.05804	-0.15860
0.00000	0.00000	0.00000	-0.25000	0.09674	-0.15381
0.00000	0.00000	0.00000	-0.25000	0.13543	-0.14632
0.00000	0.00000	0.00000	-0.25000	0.17735	-0.13465
0.00000	0.00000	0.00000	-0.25000	0.21927	-0.11822
-0.05000	0.00000	-0.07108	-0.25000	0.25797	-0.09674
-0.05000	0.01280	-0.07080	-0.25000	0.29022	-0.07028
-0.05000	0.02559	-0.06992	-0.25000	0.31150	-0.04169
-0.05000	0.04265	-0.06781	-0.25000	0.32246	0.00000
-0.05000	0.05971	-0.06451	-0.35000	0.00000	-0.19091
-0.05000	0.07819	-0.05937	-0.35000	0.03436	-0.19013
-0.05000	0.09667	-0.05212	-0.35000	0.06873	-0.18779
-0.05000	0.11373	-0.04265	-0.35000	0.11455	-0.18212
-0.05000	0.12795	-0.03098	-0.35000	0.16036	-0.17325
-0.05000	0.13733	-0.01838	-0.35000	0.21000	-0.15944
-0.05000	0.14217	0.00000	-0.35000	0.25964	-0.13998
-0.10000	0.00000	-0.10106	-0.35000	0.30545	-0.11455
-0.10000	0.01819	-0.10065	-0.35000	0.34364	-0.08322
-0.10000	0.03638	-0.09941	-0.35000	0.36884	-0.04936
-0.10000	0.06064	-0.09641	-0.35000	0.38182	0.00000
-0.10000	0.08489	-0.09172	-0.45000	0.00000	-0.21582
-0.10000	0.11117	-0.08441	-0.45000	0.03885	-0.21495
-0.10000	0.13745	-0.07410	-0.45000	0.07770	-0.21230
-0.10000	0.16170	-0.06064	-0.45000	0.12949	-0.20588
-0.10000	0.18192	-0.04405	-0.45000	0.18129	-0.19586
-0.10000	0.19526	-0.02613	-0.45000	0.23740	-0.18025
-0.10000	0.20213	0.00000	-0.45000	0.29352	-0.15824
-0.15000	0.00000	-0.12429	-0.45000	0.34532	-0.12949
-0.15000	0.02237	-0.12378	-0.45000	0.38848	-0.09407
-0.15000	0.04474	-0.12226	-0.45000	0.41697	-0.05580
-0.15000	0.07457	-0.11856	-0.45000	0.43164	0.00000
-0.15000	0.10440	-0.11279	-0.55000	0.00000	-0.23708
-0.15000	0.13672	-0.10380	-0.55000	0.04267	-0.23611
-0.15000	0.16903	-0.09113	-0.55000	0.08535	-0.23320
-0.15000	0.19886	-0.07457	-0.55000	0.14225	-0.22616
-0.15000	0.22372	-0.05418	-0.55000	0.19914	-0.21515
-0.15000	0.24012	-0.03213	-0.55000	0.26078	-0.19800
-0.15000	0.24858	0.00000	-0.55000	0.32242	-0.17383
-0.20000	0.00000	-0.14394	-0.55000	0.37932	-0.14225
-0.20000	0.02591	-0.14336	-0.55000	0.42674	-0.10334
-0.20000	0.05182	-0.14159	-0.55000	0.45803	-0.06129
-0.20000	0.08636	-0.13731	-0.55000	0.47415	0.00000
-0.20000	0.12091	-0.13063	-0.65000	0.00000	-0.25527
-0.20000	0.15833	-0.12021	-0.65000	0.04595	-0.25424
-0.20000	0.19576	-0.10554	-0.65000	0.09190	-0.25110

TABLE 1 (Continued)

X	Y	Z	X	Y	Z
-0.65000	0.15316	-0.24351	-1.20000	0.62715	0.00000
-0.65000	0.21443	-0.23167	-1.35000	0.00000	-0.31984
-0.65000	0.28080	-0.21319	-1.35000	0.05757	-0.31854
-0.65000	0.34717	-0.18717	-1.35000	0.11514	-0.31461
-0.65000	0.40844	-0.15316	-1.35000	0.19190	-0.30510
-0.65000	0.45949	-0.11127	-1.35000	0.26866	-0.29026
-0.65000	0.49319	-0.06600	-1.35000	0.35182	-0.26712
-0.65000	0.51054	0.00000	-1.35000	0.43498	-0.23451
-0.75000	0.00000	-0.27079	-1.35000	0.51174	-0.19190
-0.75000	0.04874	-0.26969	-1.35000	0.57570	-0.13941
-0.75000	0.09746	-0.26637	-1.35000	0.61792	-0.08269
-0.75000	0.16247	-0.25832	-1.35000	0.63967	0.00000
-0.75000	0.22746	-0.24575	-1.50000	0.00000	-0.32309
-0.75000	0.29787	-0.22616	-1.50000	0.05816	-0.32178
-0.75000	0.36826	-0.19855	-1.50000	0.11631	-0.31781
-0.75000	0.43327	-0.16247	-1.50000	0.19385	-0.30821
-0.75000	0.48742	-0.11804	-1.50000	0.27140	-0.29321
-0.75000	0.52317	-0.07001	-1.50000	0.35540	-0.26983
-0.75000	0.54158	0.00000	-1.50000	0.43940	-0.23689
-0.90000	0.00000	-0.28962	-1.50000	0.51695	-0.19385
-0.90000	0.05213	-0.28844	-1.50000	0.58156	-0.14083
-0.90000	0.10426	-0.28489	-1.50000	0.62421	-0.08353
-0.90000	0.17377	-0.27628	-1.50000	0.64618	0.00000
-0.90000	0.24328	-0.26284	-1.70000	0.00000	-0.32409
-0.90000	0.31858	-0.24188	-1.70000	0.05834	-0.32278
-0.90000	0.39388	-0.21235	-1.70000	0.11667	-0.31880
-0.90000	0.46339	-0.17377	-1.70000	0.19445	-0.30916
-0.90000	0.52131	-0.12624	-1.70000	0.27224	-0.29412
-0.90000	0.55954	-0.07488	-1.70000	0.35650	-0.27067
-0.90000	0.57924	0.00000	-1.70000	0.44076	-0.23763
-1.10000	0.00000	-0.30742	-1.70000	0.51854	-0.19445
-1.10000	0.05534	-0.30618	-1.70000	0.58336	-0.14127
-1.10000	0.11067	-0.30240	-1.70000	0.62614	-0.08379
-1.10000	0.18445	-0.29326	-1.70000	0.64818	0.00000
-1.10000	0.25824	-0.27899	-1.90000	0.00000	-0.32409
-1.10000	0.33817	-0.25675	-1.90000	0.05834	-0.32278
-1.10000	0.41810	-0.22541	-1.90000	0.11667	-0.31880
-1.10000	0.49188	-0.18445	-1.90000	0.19445	-0.30916
-1.10000	0.55336	-0.13400	-1.90000	0.27224	-0.29412
-1.10000	0.59394	-0.07948	-1.90000	0.35650	-0.27067
-1.10000	0.61485	0.00000	-1.90000	0.44076	-0.23763
-1.20000	0.00000	-0.31358	-1.90000	0.51854	-0.19445
-1.20000	0.05644	-0.31230	-1.90000	0.58336	-0.14127
-1.20000	0.11289	-0.30845	-1.90000	0.62614	-0.08379
-1.20000	0.18815	-0.29913	-1.90000	0.64818	0.00000
-1.20000	0.26340	-0.28458	-2.30000	0.00000	-0.32409
-1.20000	0.34493	-0.26189	-2.30000	0.05834	-0.32278
-1.20000	0.42646	-0.22992	-2.30000	0.11667	-0.31880
-1.20000	0.50172	-0.18815	-2.30000	0.19445	-0.30916
-1.20000	0.56444	-0.13668	-2.30000	0.27224	-0.29412
-1.20000	0.60583	-0.08107	-2.30000	0.35650	-0.27067

TABLE 1 (Continued)

X	Y	Z
-2.30000	0.44076	-0.23763
-2.30000	0.51854	-0.19445
-2.30000	0.58336	-0.14127
-2.30000	0.62614	-0.08379
-2.30000	0.64818	0.00000
-2.60000	0.00000	-0.32409
-2.60000	0.05834	-0.32278
-2.60000	0.11667	-0.31880
-2.60000	0.19445	-0.30916
-2.60000	0.27224	-0.29412
-2.60000	0.35650	-0.27067
-2.60000	0.44076	-0.23763
-2.60000	0.51854	-0.19445
-2.60000	0.58336	-0.14127
-2.60000	0.62614	-0.08379
-2.60000	0.64818	0.00000
-3.00000	0.00000	-0.32409
-3.00000	0.05834	-0.32278
-3.00000	0.11667	-0.31880
-3.00000	0.19445	-0.30916
-3.00000	0.27224	-0.29412
-3.00000	0.35650	-0.27067
-3.00000	0.44076	-0.23763
-3.00000	0.51854	-0.19445
-3.00000	0.58336	-0.14127
-3.00000	0.62614	-0.08379
-3.00000	0.64818	0.00000
-3.30000	0.00000	-0.32409
-3.30000	0.05834	-0.32278
-3.30000	0.11667	-0.31880
-3.30000	0.19445	-0.30916
-3.30000	0.27224	-0.29412
-3.30000	0.35650	-0.27067
-3.30000	0.44076	-0.23763
-3.30000	0.51854	-0.19445
-3.30000	0.58336	-0.14127
-3.30000	0.62614	-0.08379
-3.30000	0.64818	0.00000
-3.70000	0.00000	-0.32409
-3.70000	0.05834	-0.32278
-3.70000	0.11667	-0.31880
-3.70000	0.19445	-0.30916
-3.70000	0.27224	-0.29412
-3.70000	0.35650	-0.27067
-3.70000	0.44076	-0.23763
-3.70000	0.51854	-0.19445
-3.70000	0.58336	-0.14127
-3.70000	0.62614	-0.08379
-3.70000	0.64818	0.00000
-4.20000	0.00000	-0.32409
-4.20000	0.05834	-0.32278

X	Y	Z
-4.20000	0.11667	-0.31880
-4.20000	0.19445	-0.30916
-4.20000	0.27224	-0.29412
-4.20000	0.35650	-0.27067
-4.20000	0.44076	-0.23763
-4.20000	0.51854	-0.19445
-4.20000	0.58336	-0.14127
-4.20000	0.62614	-0.08379
-4.20000	0.64818	0.00000
-4.70000	0.00000	-0.32409
-4.70000	0.05834	-0.32278
-4.70000	0.11667	-0.31880
-4.70000	0.19445	-0.30916
-4.70000	0.27224	-0.29412
-4.70000	0.35650	-0.27067
-4.70000	0.44076	-0.23763
-4.70000	0.51854	-0.19445
-4.70000	0.58336	-0.14127
-4.70000	0.62614	-0.08379
-4.70000	0.64818	0.00000
-5.00000	0.00000	-0.32409
-5.00000	0.05834	-0.32278
-5.00000	0.11667	-0.31880
-5.00000	0.19445	-0.30916
-5.00000	0.27224	-0.29412
-5.00000	0.35650	-0.27067
-5.00000	0.44076	-0.23763
-5.00000	0.51854	-0.19445
-5.00000	0.58336	-0.14127
-5.00000	0.62614	-0.08379
-5.00000	0.64818	0.00000
-5.30000	0.00000	-0.32409
-5.30000	0.05834	-0.32278
-5.30000	0.11667	-0.31880
-5.30000	0.19445	-0.30916
-5.30000	0.27224	-0.29412
-5.30000	0.35650	-0.27067
-5.30000	0.44076	-0.23763
-5.30000	0.51854	-0.19445
-5.30000	0.58336	-0.14127
-5.30000	0.62614	-0.08379
-5.30000	0.64818	0.00000
-5.70000	0.00000	-0.32409
-5.70000	0.05834	-0.32278
-5.70000	0.11667	-0.31880
-5.70000	0.19445	-0.30916
-5.70000	0.27224	-0.29412
-5.70000	0.35650	-0.27067
-5.70000	0.44076	-0.23763
-5.70000	0.51854	-0.19445
-5.70000	0.58336	-0.14127

TABLE 1 (Continued)

X	Y	Z
-5.70000	0.62614	-0.08379
-5.70000	0.64818	0.00000
-6.10000	0.00000	-0.32409
-6.10000	0.05834	-0.32278
-6.10000	0.11667	-0.31880
-6.10000	0.19445	-0.30916
-6.10000	0.27224	-0.29412
-6.10000	0.35650	-0.27067
-6.10000	0.44076	-0.23763
-6.10000	0.51854	-0.19445
-6.10000	0.58336	-0.14127
-6.10000	0.62614	-0.08379
-6.10000	0.64818	0.00000
-6.41612	0.00000	-0.32370
-6.41612	0.05827	-0.32238
-6.41612	0.11653	-0.31841
-6.41612	0.19422	-0.30879
-6.41612	0.27191	-0.29376
-6.41612	0.35607	-0.27034
-6.41612	0.44023	-0.23734
-6.41612	0.51792	-0.19422
-6.41612	0.58266	-0.14110
-6.41612	0.62538	-0.08369
-6.41612	0.64740	0.00000
-6.79739	0.00000	-0.32031
-6.79739	0.05766	-0.31901
-6.79739	0.11531	-0.31508
-6.79739	0.19218	-0.30555
-6.79739	0.26906	-0.29069
-6.79739	0.35234	-0.26751
-6.79739	0.43562	-0.23485
-6.79739	0.51249	-0.19218
-6.79739	0.57655	-0.13962
-6.79739	0.61883	-0.08281
-6.79739	0.64062	0.00000
-7.10240	0.00000	-0.31403
-7.10240	0.05653	-0.31275
-7.10240	0.11305	-0.30890
-7.10240	0.18842	-0.29956
-7.10240	0.26378	-0.28499
-7.10240	0.34543	-0.26227
-7.10240	0.42708	-0.23025
-7.10240	0.50245	-0.18842
-7.10240	0.56525	-0.13688
-7.10240	0.60670	-0.08119
-7.10240	0.62806	0.00000
-7.40741	0.00000	-0.30405
-7.40741	0.05473	-0.30281
-7.40741	0.10946	-0.29908
-7.40741	0.18243	-0.29004
-7.40741	0.25540	-0.27593
-7.40741	0.33445	-0.25393
-7.40741	0.41350	-0.22293
-7.40741	0.48648	-0.18243
-7.40741	0.54729	-0.13253
-7.40741	0.58742	-0.07861
-7.40741	0.60810	0.00000
-7.59804	0.00000	-0.29580
-7.59804	0.05324	-0.29460
-7.59804	0.10649	-0.29097
-7.59804	0.17748	-0.28218
-7.59804	0.24847	-0.26845
-7.59804	0.32538	-0.24704
-7.59804	0.40229	-0.21688
-7.59804	0.47328	-0.17748
-7.59804	0.53244	-0.12894
-7.59804	0.57149	-0.07648
-7.59804	0.59160	0.00000
-7.90305	0.00000	-0.27920
-7.90305	0.05026	-0.27806
-7.90305	0.10051	-0.27464
-7.90305	0.16752	-0.26634
-7.90305	0.23452	-0.25338
-7.90305	0.30712	-0.23317
-7.90305	0.37971	-0.20471
-7.90305	0.44671	-0.16752
-7.90305	0.50255	-0.12170
-7.90305	0.53941	-0.07218
-7.90305	0.55839	0.00000
-8.09368	0.00000	-0.26655
-8.09368	0.04798	-0.26547
-8.09368	0.09596	-0.26220
-8.09368	0.15993	-0.25427
-8.09368	0.22390	-0.24190
-8.09368	0.29320	-0.22261
-8.09368	0.36251	-0.19544
-8.09368	0.42648	-0.15993
-8.09368	0.47979	-0.11619
-8.09368	0.51497	-0.06891
-8.09368	0.53310	0.00000
-8.39869	0.00000	-0.24233
-8.39869	0.04362	-0.24135
-8.39869	0.08724	-0.23837
-8.39869	0.14540	-0.23117
-8.39869	0.20356	-0.21992
-8.39869	0.26656	-0.20239
-8.39869	0.32957	-0.17768
-8.39869	0.38773	-0.14540
-8.39869	0.43620	-0.10563
-8.39869	0.46818	-0.06265
-8.39869	0.48466	0.00000
-8.62745	0.00000	-0.22060

TABLE 1 (Continued)

X	Y	Z
-8.62745	0.03971	-0.21970
-8.62745	0.07942	-0.21700
-8.62745	0.13236	-0.21044
-8.62745	0.18530	-0.20020
-8.62745	0.24266	-0.18424
-8.62745	0.30001	-0.16175
-8.62745	0.35296	-0.13236
-8.62745	0.39708	-0.09616
-8.62745	0.42620	-0.05703
-8.62745	0.44120	0.00000
-8.81808	0.00000	-0.19986
-8.81808	0.03598	-0.19905
-8.81808	0.07195	-0.19660
-8.81808	0.11992	-0.19066
-8.81808	0.16789	-0.18138
-8.81808	0.21985	-0.16692
-8.81808	0.27182	-0.14654
-8.81808	0.31978	-0.11992
-8.81808	0.35976	-0.08712
-8.81808	0.38614	-0.05167
-8.81808	0.39973	0.00000
-9.00871	0.00000	-0.17648
-9.00871	0.03177	-0.17576
-9.00871	0.06353	-0.17360
-9.00871	0.10589	-0.16835
-9.00871	0.14824	-0.16016
-9.00871	0.19413	-0.14739
-9.00871	0.24001	-0.12940
-9.00871	0.28236	-0.10589
-9.00871	0.31766	-0.07692
-9.00871	0.34096	-0.04563
-9.00871	0.35296	0.00000
-9.19935	0.00000	-0.15016
-9.19935	0.02703	-0.14955
-9.19935	0.05406	-0.14770
-9.19935	0.09009	-0.14324
-9.19935	0.12613	-0.13627
-9.19935	0.16517	-0.12541
-9.19935	0.20421	-0.11010
-9.19935	0.24025	-0.09009
-9.19935	0.27028	-0.06545
-9.19935	0.29010	-0.03882
-9.19935	0.30031	0.00000
-9.30000	0.00000	-0.13441
-9.30000	0.02419	-0.13386
-9.30000	0.04839	-0.13221
-9.30000	0.08065	-0.12822
-9.30000	0.11290	-0.12198
-9.30000	0.14785	-0.11225
-9.30000	0.18280	-0.09855
-9.30000	0.21505	-0.08065

X	Y	Z
-9.30000	0.24194	-0.05859
-9.30000	0.25968	-0.03475
-9.30000	0.26882	0.00000
-9.50000	0.00000	-0.09976
-9.50000	0.01796	-0.09936
-9.50000	0.03591	-0.09813
-9.50000	0.05986	-0.09517
-9.50000	0.08380	-0.09054
-9.50000	0.10974	-0.08332
-9.50000	0.13567	-0.07315
-9.50000	0.15962	-0.05986
-9.50000	0.17957	-0.04348
-9.50000	0.19274	-0.02579
-9.50000	0.19952	0.00000
-9.57000	0.00000	-0.08662
-9.57000	0.01559	-0.08627
-9.57000	0.03118	-0.08521
-9.57000	0.05197	-0.08263
-9.57000	0.07276	-0.07861
-9.57000	0.09528	-0.07234
-9.57000	0.11780	-0.06351
-9.57000	0.13859	-0.05197
-9.57000	0.15592	-0.03776
-9.57000	0.16735	-0.02240
-9.57000	0.17324	0.00000
-9.67000	0.00000	-0.06741
-9.67000	0.01213	-0.06714
-9.67000	0.02427	-0.06631
-9.67000	0.04045	-0.06431
-9.67000	0.05663	-0.06118
-9.67000	0.07415	-0.05630
-9.67000	0.09168	-0.04943
-9.67000	0.10786	-0.04045
-9.67000	0.12134	-0.02938
-9.67000	0.13024	-0.01743
-9.67000	0.13482	0.00000
-9.74000	0.00000	-0.05409
-9.74000	0.00974	-0.05387
-9.74000	0.01947	-0.05321
-9.74000	0.03246	-0.05160
-9.74000	0.04544	-0.04909
-9.74000	0.05950	-0.04518
-9.74000	0.07357	-0.03966
-9.74000	0.08655	-0.03246
-9.74000	0.09737	-0.02358
-9.74000	0.10451	-0.01399
-9.74000	0.10819	0.00000
-9.78000	0.00000	-0.04826
-9.78000	0.00869	-0.04806
-9.78000	0.01737	-0.04747
-9.78000	0.02896	-0.04604

TABLE 1 (Continued)

X	Y	Z
-9.78000	0.04054	-0.04380
-9.78000	0.05309	-0.04031
-9.78000	0.06563	-0.03538
-9.78000	0.07722	-0.02896
-9.78000	0.08687	-0.02104
-9.78000	0.09324	-0.01248
-9.78000	0.09652	0.00000
-9.81000	0.00000	-0.04514
-9.81000	0.00812	-0.04495
-9.81000	0.01625	-0.04440
-9.81000	0.02708	-0.04306
-9.81000	0.03792	-0.04096
-9.81000	0.04965	-0.03770
-9.81000	0.06139	-0.03309
-9.81000	0.07222	-0.02708
-9.81000	0.08125	-0.01967
-9.81000	0.08720	-0.01167
-9.81000	0.09027	0.00000
-9.87000	0.00000	-0.03960
-9.87000	0.00713	-0.03944
-9.87000	0.01426	-0.03895
-9.87000	0.02376	-0.03777
-9.87000	0.03326	-0.03594
-9.87000	0.04356	-0.03307
-9.87000	0.05385	-0.02903
-9.87000	0.06336	-0.02376
-9.87000	0.07128	-0.01726
-9.87000	0.07650	-0.01024
-9.87000	0.07920	0.00000
-9.91000	0.00000	-0.03589
-9.91000	0.00646	-0.03574
-9.91000	0.01292	-0.03530
-9.91000	0.02153	-0.03423
-9.91000	0.03014	-0.03257
-9.91000	0.03947	-0.02997
-9.91000	0.04880	-0.02631
-9.91000	0.05742	-0.02153
-9.91000	0.06459	-0.01564
-9.91000	0.06933	-0.00928
-9.91000	0.07177	0.00000
-9.96000	0.00000	-0.03082
-9.96000	0.00555	-0.03069
-9.96000	0.01109	-0.03031
-9.96000	0.01849	-0.02940
-9.96000	0.02589	-0.02797
-9.96000	0.03390	-0.02574
-9.96000	0.04191	-0.02260
-9.96000	0.04931	-0.01849
-9.96000	0.05547	-0.01343
-9.96000	0.05954	-0.00797
-9.96000	0.06164	0.00000

X	Y	Z
-9.98000	0.00000	-0.02852
-9.98000	0.00513	-0.02840
-9.98000	0.01027	-0.02805
-9.98000	0.01711	-0.02721
-9.98000	0.02396	-0.02588
-9.98000	0.03137	-0.02382
-9.98000	0.03879	-0.02091
-9.98000	0.04563	-0.01711
-9.98000	0.05134	-0.01243
-9.98000	0.05510	-0.00737
-9.98000	0.05704	0.00000
-10.02000	0.00000	-0.02027
-10.02000	0.00365	-0.02019
-10.02000	0.00730	-0.01994
-10.02000	0.01216	-0.01934
-10.02000	0.01703	-0.01840
-10.02000	0.02230	-0.01693
-10.02000	0.02757	-0.01486
-10.02000	0.03243	-0.01216
-10.02000	0.03649	-0.00884
-10.02000	0.03916	-0.00524
-10.02000	0.04054	0.00000
-10.04000	0.00000	-0.01338
-10.04000	0.00241	-0.01332
-10.04000	0.00482	-0.01316
-10.04000	0.00803	-0.01276
-10.04000	0.01124	-0.01214
-10.04000	0.01471	-0.01117
-10.04000	0.01819	-0.00981
-10.04000	0.02140	-0.00803
-10.04000	0.02408	-0.00583
-10.04000	0.02584	-0.00346
-10.04000	0.02675	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000
-10.06000	0.00000	0.00000

TABLE 2 - MEASURED PRESSURE COEFFICIENTS

x/L	ANGULAR POSITION θ (DEGREES)						
	0	45	67	77	80	84	90
0.497	-0.0111	-0.0170	-0.0147	-0.0135	-0.0135	-0.0039	-0.0159
0.767	-0.0588	-0.0600	-0.0576	-0.0492	-0.0564	-0.0552	-0.0552
0.806	-0.0397	-0.0516	-0.0504	-0.0409	-0.0433	-0.0421	-0.0480
0.858	-0.0302	-0.0266	-0.0254	-0.0159	-0.0135	-0.0099	-0.0254
0.894	-0.0074	+0.0044	+0.0104	+0.0211	+0.0223	+0.0259	+0.0223
0.907	+0.0092	+0.0139	+0.0282	+0.0354	+0.0390	+0.0426	+0.0437
0.914	+0.0116	+0.0187	+0.0318	+0.0437	+0.0437	+0.0473	+0.0485
0.934	+0.0664	+0.0688	+0.0735	+0.0795	+0.0783	+0.0771	+0.0795
0.944	+0.0974	+0.0986	+0.0986	+0.0998	+0.0998	+0.0998	+0.1010
0.956	+0.1272	+0.1260	+0.1260	+0.1236	+0.1260	+0.1236	+0.1284

TABLE 3 - MEASURED SHEAR STRESS COEFFICIENTS

x/L	ANGULAR POSITION θ (DEGREES)						
	0	45	67	77	80	84	90
0.767	0.00268	0.00268	0.00265	0.00262	0.00268	0.00270	0.00296
0.806	0.00252	0.00259	0.00257	0.00252	0.00247	0.00238	0.00228
0.858	0.00244	0.00241	0.00234	0.00227	0.00199	*	0.00196
0.894	0.00228	0.00219	0.00208	0.00191	0.00163	*	0.00150
0.907	0.00218	0.00195	0.00181	0.00165	*	0.00131	0.00138
0.914	0.00207	0.00189	0.00177	0.00154	0.00139	0.00123	0.00133
0.934	0.00159	0.00145	0.00128	0.00100	0.00104	0.00102	0.00106
0.944	0.00138	0.00132	0.00101	0.00085	0.00089	*	0.00085
0.956	0.00120	0.00116	0.00085	0.00070	0.00057	0.00063	0.00035

* No measurement at this location.

TABLE 4 - MEASURED STATIC PRESSURE COEFFICIENTS ACROSS STERN BOUNDARY LAYER

0° PLANE

x/L = 0.767		x/L = 0.806		x/L = 0.858		x/L = 0.894		x/L = 0.907		x/L = 0.914		x/L = 0.934		x/L = 0.944		x/L = 0.956	
n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p
0.000	-0.0573	0.000	-0.0415	0.000	-0.0289	0.000	+0.0046	0.000	+0.0083	0.000	+0.0259	0.000	+0.0664	0.000	+0.0974	0.000	+0.1272
0.281	-0.0495	0.188	-0.0413	0.125	-0.0252	0.094	+0.0106	0.326	+0.0176	0.188	+0.0292	0.408	+0.0667	0.188	+0.0955	0.344	+0.1220
0.409	-0.0493	0.393	-0.0409	0.187	-0.0227	1.192	+0.0089	0.415	+0.0187	0.350	+0.0300	0.721	+0.0622	0.374	+0.0961	0.526	+0.1153
0.536	-0.0490	0.923	-0.0428	0.365	-0.0226	1.694	+0.0081	0.651	+0.0171	0.694	+0.0306	0.876	+0.0606	0.779	+0.0849	0.874	+0.1094
0.977	-0.0471	1.131	-0.0412	0.805	-0.0226	2.340	+0.0097	0.902	+0.0191	2.221	+0.0250	1.220	+0.0584	1.336	+0.0769	1.465	+0.0966
1.421	-0.0439	1.630	-0.0369	1.010	-0.0214	2.873	+0.0089	1.416	+0.0194	2.816	+0.0238	1.595	+0.0562	1.954	+0.0649	1.620	+0.0900
2.090	-0.0390	2.144	-0.0338	1.748	-0.0164	3.758	+0.0100	2.092	+0.0182	3.748	+0.0193	2.372	+0.0518	2.553	+0.0604	2.369	+0.0779
2.925	-0.0338	2.974	-0.0267	2.545	-0.0126	4.326	+0.0117	2.861	+0.0181	4.559	+0.0190	4.339	+0.0355	3.740	+0.0476	3.150	+0.0645
3.872	-0.0286	3.346	-0.0262	3.669	-0.0076	6.066	+0.0088	4.002	+0.0173	5.715	+0.0141	5.866	+0.0255	4.923	+0.0312	4.584	+0.0477
5.255	-0.0200	4.173	-0.0190	4.852	-0.0027	7.488	+0.0029	5.907	+0.0114	6.840	+0.0106	6.550	+0.0200	6.075	+0.0272	6.107	+0.0311
6.152	-0.0148	4.826	-0.0146	5.857	-0.0001	8.609	0.0000	7.770	+0.0032	7.775	+0.0062	7.393	+0.0154	7.265	+0.0107	7.696	+0.0189
7.304	-0.0092	6.098	-0.0093	7.249	-0.0014			8.806	0.0000			8.545	+0.0062	8.421	+0.0030	9.327	+0.0053
		7.833	-0.0035	8.041	0.0000							9.457	+0.0001			9.848	0.0000

67° PLANE

x/L = 0.767		x/L = 0.806		x/L = 0.858		x/L = 0.894		x/L = 0.907		x/L = 0.914		x/L = 0.934		x/L = 0.944		x/L = 0.956	
n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p
0.000	-0.0576					0.000	+0.0104			0.000	+0.0318			0.000	+0.0974	0.000	+0.1285
0.313	-0.0535					0.094	+0.0021			0.109	+0.0391			0.141	+0.0986	0.500	+0.1197
0.792	-0.0514					0.187	+0.0056			0.257	+0.0400			0.238	+0.0970	0.759	+0.1138
1.333	-0.0467					0.872	+0.0007			0.879	+0.0402			0.671	+0.0932	1.149	+0.1025
2.268	-0.0388					1.727	+0.0018			1.582	+0.0280			1.177	+0.0991	2.181	+0.0820
3.150	-0.0323					3.203	+0.0070			2.452	+0.0278			1.711	+0.0863	3.066	+0.0668
4.373	-0.0253					4.324	+0.0052			3.704	+0.0257			2.329	+0.0770	3.998	+0.051[illegible]
5.496	-0.0196					5.557	+0.0020			5.173	+0.0194			3.245	+0.0605	5.177	+0.0353
6.412	-0.0168					7.080	-0.0017			6.120	+0.0152			4.219	+0.0476	6.557	+0.0247
7.154	-0.0130					8.305	-0.0039			7.453	+0.0092			5.606	+0.0322	6.734	+0.0230
										8.516	+0.0049			6.836	+0.0209	8.006	+0.0091
														8.119	+0.0108	9.482	-0.0006
														9.619	0.0000		

TABLE 4 (Continued)

80° PLANE

x/L = 0.767		x/L = 0.806		x/L = 0.858		x/L = 0.894		x/L = 0.907		x/L = 0.914		x/L = 0.934		x/L = 0.944		x/L = 0.956	
n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p
0.000	−0.0452	0.000	−0.0393	0.000	−0.0066	0.000	+0.0318	0.000	+0.0319	0.000	+0.0456	0.000	+0.0792	0.000	+0.098[illegible]	0.000	+0.1238
0.125	−0.0537	0.125	−0.0513	0.125	−0.0228	0.125	+0.0291	0.094	+0.0379	0.188	+0.0477	0.094	+0.0802	0.188	+0.1006	0.531	+0.1246
0.365	−0.0494	0.396	−0.0484	0.303	−0.0290	0.303	+0.0288	0.442	+0.0420	0.373	+0.0486	0.426	+0.0792	0.578	+0.1005	0.813	+0.1186
0.991	−0.0454	0.952	−0.0425	0.682	−0.0214	0.801	+0.0279	0.910	+0.0398	0.810	+0.0477	0.938	+0.0777	1.251	+0.0921	1.215	+0.1126
1.888	−0.0358	1.868	−0.0310	1.246	−0.0189	1.586	+0.0152	1.795	+0.0318	1.436	+0.0427	1.231	+0.0731	1.611	+0.0847	1.555	+0.1065
2.498	−0.0307	2.645	−0.0272	2.235	−0.0127	2.382	+0.0140	2.297	+0.0282	2.255	+0.0335	1.966	+0.0635	2.221	+0.0741	2.421	+0.0913
3.148	−0.0242	3.928	−0.0202	3.136	−0.0089	3.047	+0.0129	2.959	+0.0231	3.299	+0.0289	2.348	+0.0574	3.106	+0.0588	3.101	+0.0767
4.214	−0.0167	4.918	−0.0148	4.442	−0.0050	4.307	+0.0104	4.648	+0.0147	4.161	+0.0247	2.967	+0.0493	5.588	+0.0344	3.720	+0.064[illegible]
5.127	−0.0108	5.745	−0.0085	5.803	−0.0026	5.606	+0.0080	5.835	+0.0084	5.050	+0.0192	3.740	+0.0409	6.597	+0.0211	4.547	+0.0[illegible]22
5.277	−0.0092			6.626	−0.0012	6.792	+0.0059	6.689	+0.0042	6.515	+0.0113	4.559	+0.0297	7.752	+0.0111	5.351	+0.03[illegible]
						7.322	+0.0049	7.489	0.0000	7.756	+0.0075	5.058	+0.0258	8.900	+0.0024	6.649	+0.0231
												6.244	+0.0173			7.863	+0.0119
												7.720	+0.0067			9.359	+0.0032
												8.370	+0.0035				

84° PLANE

x/L = 0.767		x/L = 0.806		x/L = 0.858		x/L = 0.894		x/L = 0.907		x/L = 0.914		x/L = 0.934		x/L = 0.944		x/L = 0.956	
n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p
						0.000	+0.0306			0.000	+0.0517			0.000	+0.1013	0.000	+0.1263
						0.094	+0.0280			0.094	+0.0553			0.563	+0.0969	0.375	+0.1251
						0.357	+0.0275			0.164	+0.0551			0.851	+0.0947	0.506	+0.1210
						0.540	+0.0271			0.368	+0.0547			1.510	+0.0850	1.078	+0.1092
						1.456	+0.0254			0.685	+0.0529			1.769	+0.0828	1.732	+0.0970
						1.780	+0.0234			1.188	+0.0506			2.310	+0.0687	2.377	+0.0800
						3.140	+0.0146			1.806	+0.0445			2.715	+0.0611	3.057	+0.0654
						4.767	+0.0091			2.541	+0.0381			3.279	+0.0542	4.065	+0.0559
						6.012	+0.0029			2.927	+0.0323			3.928	+0.0446	4.996	+0.0416
						6.928	+0.0011			3.696	+0.0246			4.558	+0.0376	5.746	+0.0342
										5.239	+0.0179			5.494	+0.0269	6.968	+0.0189
										7.160	+0.0092			7.005	+0.0156	8.514	+0.0076
										7.527	+0.0060			8.718	+0.0024	9.105	+0.0032

TABLE 4 (Continued)

90° PLANE

x/L = 0.767		x/L = 0.806		x/L = 0.858		x/L = 0.894		x/L = 0.907		x/L = 0.914		x/L = 0.934		x/L = 0.944		x/L = 0.956	
n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p	n_e (in.)	C_p
0.000	-0.0529	0.000	-0.0358	0.000	-0.0183	0.000	+0.0107	0.000	+0.0416	0.000	+0.0492	0.000	+0.0791	0.000	+0.1025	0.000	+0.1249
0.175	-0.0474	0.125	-0.0301	0.078	-0.0029	0.229	+0.0335	0.125	+0.0414	0.094	+0.0541	0.219	+0.0834	0.125	+0.0983	0.250	+0.1204
0.241	-0.0352	0.272	-0.0250	0.306	-0.0003	0.361	+0.0357	0.268	+0.0460	0.183	+0.0526	0.296	+0.0844	0.423	+0.0998	0.459	+0.1172
0.341	-0.0335	0.438	-0.0224	0.623	+0.0009	0.527	+0.0354	0.481	+0.0467	0.299	+0.0548	0.476	+0.0838	0.701	+0.0989	0.810	+0.1123
0.562	-0.0314	0.844	-0.0205	0.998	-0.0003	0.751	+0.0350	0.685	+0.0463	0.596	+0.0542	0.652	+0.0833	1.048	+0.0927	1.286	+0.1045
1.281	-0.0247	1.258	-0.0173	1.984	-0.0002	1.095	+0.0345	0.921	+0.0445	1.276	+0.0529	0.830	+0.0816	1.523	+0.0874	1.599	+0.0984
2.092	-0.0141	1.687	-0.0154	2.169	+0.0010	1.192	+0.0337	1.184	+0.0426	2.091	+0.0500	1.030	+0.0784	1.790	+0.0840	2.747	+0.0759
2.780	-0.0075	2.313	-0.0107	2.873	+0.0010	1.829	+0.0314	1.424	+0.0384	2.648	+0.0452	1.500	+0.0745	2.836	+0.0694	3.041	+0.0724
3.248	-0.0031	3.155	-0.0056	3.530	+0.0011	2.390	+0.0293	1.953	+0.0360	2.934	+0.0421	2.150	+0.0675	3.489	+0.0609	3.485	+0.0647
3.936	+0.0011	3.874	-0.0032	4.264	+0.0011	3.430	+0.0263	2.614	+0.0320	3.405	+0.0387	2.413	+0.0642	4.019	+0.0554	4.494	+0.0464
4.091	+0.0030	5.030	+0.0012	6.050	0.0000	4.380	+0.0224	3.136	+0.0308	3.703	+0.0369	2.533	+0.0601	4.745	+0.0468	4.707	+0.0432
						5.629	+0.0141	4.239	+0.0172	4.625	+0.0312	2.758	+0.0569	5.410	+0.0407	5.661	+0.0325
						7.129	+0.0092	5.186	+0.0113	6.195	+0.0207	3.543	+0.0482	6.415	+0.0287	6.697	+0.0216
						8.257	+0.0049	6.191	+0.0065	6.782	+0.0182	3.945	+0.0446	7.339	+0.0181	8.827	+0.0019
								6.902	+0.0037	7.316	+0.0147	4.830	+0.0355	8.699	+0.0073		
												5.959	+0.0233				
												6.848	+0.0169				
												7.969	+0.0084				

TABLE 5 - MEASURED MEAN AND TURBULENT VELOCITY CHARACTERISTICS FOR VARYING AXIAL LOCATIONS ALONG 0° PLANE

(a) x/L = 0.497

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.6\delta_a)(b+0.6\delta_b)-ab}}$
0.0052	0.672	-0.015	0.060	0.029	0.0251	0.056	0.0688	0.0004	0.0040	0.0013
0.0078	0.711	-0.013	0.060	0.029	0.0264	0.059	0.1026	0.0022	0.0185	0.0062
0.0101	0.729	-0.012	0.060	0.029	0.0249	0.057	0.1321	0.0022	0.0192	0.0064
0.0127	0.766	-0.011	0.057	0.029	0.0249	0.061	0.1659	0.0022	0.0198	0.0066
0.0149	0.782	-0.011	0.056	0.029	0.0267	0.068	0.1954	0.0043	0.0363	0.0120
0.0175	0.793	-0.011	0.055	0.028	0.0271	0.071	0.2292	0.0051	0.0430	0.0143
0.0197	0.806	-0.011	0.054	0.028	0.0266	0.072	0.2587	0.0032	0.0276	0.0092
0.0223	0.832	-0.010	0.052	0.028	0.0235	0.068	0.2925	0.0026	0.0239	0.0079
0.0297	0.858	-0.008	0.050	0.027	0.0228	0.069	0.3896	0.0052	0.0477	0.0158
0.0394	0.906	-0.010	0.043	0.024	0.0161	0.066	0.5162	0.0033	0.0362	0.0120
0.0442	0.927	-0.009	0.040	0.023	0.0147	0.070	0.5796	0.0032	0.0368	0.0122
0.0516	0.958	-0.010	0.033	0.019	0.0051	0.035	0.6766	0.0013	0.0265	0.0088
0.0581	0.977	-0.013	0.027	0.016	0.0032	0.033	0.7611	0.0012	0.0293	0.0097
0.0687	0.997	-0.013	0.016	0.012	0.0006	0.015	0.9004	0.0004	0.0233	0.0077
0.0809	1.007	-0.013	0.006	0.006						
0.1009	1.008	-0.013	0.003	0.003						
0.2552	1.008	-0.009	0.002	0.001						
0.4549	1.007	-0.006	0.002	0.001						
0.6366	1.010	-0.005	0.002	0.001						

$\delta^*_p =$ 0.01070 $\delta_r =$ 0.07631 $\frac{U_\delta}{U_o} =$ 0.99560

$a =$ 0.64800 $\delta_a =$ 0.10498 $b =$ 0.32400 $\delta_b =$ 0.07631

TABLE 5 (Continued)

(b) x/L = 0.767

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0065	0.698	-0.005	-0.012	0.066	0.033	0.032	0.0726	-0.0116	0.112	-0.018	0.0671	0.0012	0.0061	0.0025
0.0091	0.753	-0.008	-0.017	0.062	0.032	0.044	0.0675	-0.0162	0.099	-0.024	0.0937	0.0030	0.0162	0.0065
0.0123	0.787	-0.010	-0.011	0.060	0.033	0.042	0.0651	-0.0172	0.101	-0.027	0.1270	0.0055	0.0306	0.0123
0.0149	0.805	-0.011	-0.010	0.059	0.032	0.041	0.0628	-0.0185	0.102	-0.030	0.1536	0.0047	0.0265	0.0107
0.0168	0.828	-0.012	-0.010	0.057	0.032	0.041	0.0633	-0.0177	0.105	-0.029	0.1736	0.0054	0.0303	0.0122
0.0200	0.838	-0.012	-0.009	0.054	0.031	0.041	0.0589	-0.0162	0.105	-0.029	0.2068	0.0135	0.0790	0.0319
0.0265	0.858	-0.012	-0.008	0.052	0.031	0.040	0.0519	-0.0136	0.098	-0.026	0.2734	0.0105	0.0652	0.0263
0.0332	0.887	-0.013	-0.009	0.050	0.029	0.039	0.0465	-0.0115	0.095	-0.024	0.3432	0.0089	0.0587	0.0237
0.0416	0.913	-0.013	-0.008	0.045	0.028	0.037	0.0423	-0.0144	0.101	-0.034	0.4297	0.0107	0.0738	0.0298
0.0513	0.937	-0.013	-0.007	0.041	0.026	0.034	0.0354	-0.0122	0.100	-0.035	0.5295	0.0102	0.0767	0.0309
0.0667	0.978	-0.014	-0.006	0.032	0.021	0.028	0.0180	-0.0106	0.081	-0.048	0.6892	0.0057	0.0603	0.0243
0.0825	1.009	-0.014	-0.005	0.019	0.014	0.018	0.0038	-0.0064	0.043	-0.073	0.8522	0.0023	0.0526	0.0212
0.0954	1.017	-0.013	-0.004	0.010	0.009	0.011	0.0011	-0.0035	0.033	-0.110	0.9852	0.0017	0.0729	0.0294
0.1395	1.018	-0.013	-0.003	0.003	0.003	0.001								
0.2010	1.016	-0.013	-0.003	0.003	0.001	0.001								
0.2825	1.013	-0.016	-0.002	0.003	0.001	0.001								

$\delta_p^* = 0.01337$ $\delta_r = 0.09683$ $\frac{U_\delta}{U_o} = 1.02758$

$a = 0.58000$ $\delta_a = 0.11447$ $b = 0.29000$ $\delta_b = 0.09683$

TABLE 5 (Continued)

(c) x/L = 0.806

n_e (ft)	$\frac{u_s}{U_e}$	$\frac{v_n}{U_e}$	$\frac{v_\theta}{U_e}$	$\frac{\sqrt{\overline{u_s'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_e}$	$100\frac{-\overline{u_s'v_n'}}{U_e^2}$	$100\frac{-\overline{u_s'v_\theta'}}{U_e^2}$	$\frac{-\overline{u_s'v_n'}}{q^2}$	$\frac{-\overline{u_s'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{l_p^*}{\delta_r}$	$\frac{l}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)}-ab}$
0.0052	0.672	-0.021	-0.017	0.064	0.032	0.030	0.0765	-0.0080	0.127	-0.013	0.0514	0.0008	0.0042	0.0018
0.0078	0.759	-0.025	-0.026	0.061	0.033	0.044	0.0698	-0.0119	0.103	-0.018	0.0766	0.0026	0.0139	0.0060
0.0101	0.771	-0.026	-0.023	0.060	0.032	0.044	0.0717	-0.0058	0.109	-0.009	0.0987	0.0094	0.0492	0.0210
0.0127	0.784	-0.026	-0.021	0.059	0.032	0.043	0.0714	-0.0064	0.110	-0.010	0.1239	0.0095	0.0495	0.0212
0.0188	0.818	-0.027	-0.019	0.055	0.032	0.043	0.0622	-0.0057	0.106	-0.010	0.1839	0.0095	0.0530	0.0226
0.0262	0.844	-0.028	-0.019	0.052	0.031	0.042	0.0577	-0.0123	0.106	-0.023	0.2564	0.0113	0.0655	0.0280
0.0333	0.870	-0.028	-0.018	0.049	0.030	0.039	0.0521	-0.0084	0.106	-0.017	0.3258	0.0094	0.0576	0.0246
0.0394	0.895	-0.029	-0.019	0.046	0.028	0.038	0.0422	-0.0083	0.096	-0.019	0.3857	0.0082	0.0557	0.0238
0.0497	0.925	-0.030	-0.019	0.042	0.026	0.036	0.0333	-0.0062	0.091	-0.017	0.4866	0.0084	0.0640	0.0274
0.0600	0.952	-0.030	-0.017	0.036	0.023	0.032	0.0250	-0.0088	0.087	-0.031	0.5876	0.0078	0.0685	0.0293
0.0677	0.967	-0.029	-0.019	0.033	0.021	0.029	0.0234	-0.0068	0.096	-0.028	0.6632	0.0084	0.0770	0.0329
0.0845	1.000	-0.030	-0.019	0.020	0.015	0.020	0.0060	-0.0062	0.058	-0.059	0.8272	0.0032	0.0570	0.0244
0.1051	1.012	-0.029	-0.018	0.008	0.008	0.002								
0.1354	1.012	-0.028	-0.017	0.004	0.003	0.001								
0.1821	1.012	-0.026	-0.017	0.003	0.002	0.001								
0.2339	1.010	-0.024	-0.018	0.003	0.001	0.001								
0.2835	1.010	-0.022	-0.017	0.003	0.001	0.001								

$\delta_p^* =$ 0.01390 $\delta_r =$ 0.10213 $\frac{U_\delta}{U_e} =$ 1.02639

$a =$ 0.53300 $\delta_a =$ 0.12389 $b =$ 0.26700 $\delta_b =$ 0.10213

TABLE 5 (Continued)

(d) x/L = 0.858

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_d\delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0065	0.656	0.038	0.017	0.064	0.032	0.036	0.0834	-0.0011	0.130	-0.002	0.0552	0.0010	0.0053	0.0025
0.0088	0.718	0.044	0.020	0.062	0.032	0.044	0.0743	-0.0007	0.110	-0.001	0.0744	0.0018	0.0096	0.0046
0.0210	0.780	-0.046	-0.013	0.058	0.032	0.042	0.0666	0.0012	0.109	0.002	0.1783	0.0066	0.0375	0.0181
0.0255	0.808	-0.050	0.012	0.054	0.032	0.041	0.0589	0.0024	0.104	0.004	0.2166	0.0075	0.0453	0.0219
0.0300	0.821	0.049	0.013	0.053	0.031	0.041	0.0624	-0.0003	0.116	-0.001	0.2549	0.0106	0.0616	0.0298
0.035[illegible]	0.842	0.050	-0.014	0.051	0.031	0.040	0.0545	0.0006	0.105	0.001	0.2987	0.0071	0.0443	0.0214
0.0407	0.867	-0.052	-0.014	0.048	0.030	0.039	0.0499	0.0012	0.106	0.002	0.3424	0.0071	0.0462	0.0223
0.048[illegible]	0.889	-0.051	-0.014	0.045	0.028	0.038	0.0440	-0.0059	0.104	-0.014	0.4081	0.0094	0.0654	0.0316
0.0547	0.912	0.052	0.014	0.041	0.026	0.035	0.0347	-0.0010	0.096	-0.003	0.4819	0.0073	0.0567	0.0274
0.0671	0.943	-0.052	-0.014	0.036	0.023	0.033	0.0276	-0.0002	0.093	-0.001	0.5695	0.0063	0.0550	0.0266
0.0741	0.959	-0.053	-0.014	0.033	0.021	0.030	0.0215	-0.0052	0.088	-0.021	0.6296	0.0058	0.0576	0.0278
0.0848	0.980	-0.053	0.013	0.026	0.018	0.026	0.0106	-0.0049	0.065	-0.030	0.7199	0.0037	0.0530	0.0256
0.1057	1.000	-0.051	-0.013	0.013	0.011	0.016	0.0018	-0.0030	0.034	-0.055	0.8977	0.0016	0.0537	0.0260
0.1473	1.004	-0.048	-0.012	0.004	0.003	0.019								
0.2043	1.003	-0.043	-0.012	0.003	0.002	0.016								
0.3263	1.003	-0.035	-0.011	0.003	0.001	0.002								

δ_p^* 0.01684 δ_r 0.11775 $\frac{U_d}{U_o} =$ 1.01876

a 0.44100 δ_a 0.16097 $b =$ 0.22100 $\delta_b =$ 0.11775

TABLE 5 (Continued)

(e) x/L = 0.894

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)}-ab}$
0.0065	0.616	-0.057	-0.014	0.060	0.034	0.036	0.0694	-0.0010	0.114	-0.002	0.0432	0.0008	0.0041	0.0024
0.0088	0.671	-0.061	-0.016	0.061	0.033	0.043	0.0669	-0.0020	0.101	-0.003	0.0582	0.0018	0.0093	0.0053
0.0126	0.703	-0.062	-0.012	0.059	0.033	0.042	0.0747	-0.0065	0.118	-0.010	0.0838	0.0051	0.0246	0.0141
0.0175	0.732	-0.064	-0.012	0.058	0.033	0.042	0.0671	-0.0086	0.108	-0.014	0.1159	0.0072	0.0366	0.0210
0.0245	0.752	-0.061	-0.011	0.056	0.033	0.042	0.0674	-0.0075	0.113	-0.013	0.1630	0.0085	0.0430	0.0247
0.0319	0.791	-0.055	-0.011	0.053	0.032	0.041	0.0547	-0.0033	0.099	-0.006	0.2122	0.0062	0.0346	0.0198
0.0416	0.825	-0.058	-0.012	0.051	0.031	0.039	0.0499	-0.0022	0.097	-0.004	0.2764	0.0071	0.0418	0.0240
0.0503	0.856	-0.059	-0.012	0.048	0.028	0.038	0.0445	-0.0065	0.098	-0.014	0.3342	0.0075	0.0467	0.0268
0.0600	0.879	-0.061	-0.012	0.045	0.028	0.037	0.0437	-0.0061	0.106	-0.015	0.3984	0.0096	0.0604	0.0347
0.0716	0.905	-0.062	-0.013	0.041	0.026	0.033	0.0361	-0.0061	0.104	-0.017	0.4754	0.0078	0.0540	0.0310
0.0819	0.930	-0.063	-0.014	0.038	0.024	0.030	0.0304	-0.0068	0.103	-0.023	0.5438	0.0066	0.0499	0.0287
0.0977	0.965	-0.063	-0.014	0.030	0.019	0.025	0.0192	-0.0057	0.103	-0.030	0.6487	0.0052	0.0488	0.0280
0.1183	0.995	-0.062	-0.013	0.018	0.014	0.015	0.0062	-0.0034	0.083	-0.045	0.7856	0.0028	0.0475	0.0273
0.1650	1.007	-0.057	-0.014	0.006	0.006	0.008								
0.2094	1.007	-0.053	-0.015	0.006	0.005	0.002								
0.2742	1.007	-0.046	-0.016	0.006	0.005	0.001								
0.3859	1.008	-0.042	-0.016	0.006	0.005	0.001								

$\delta^*_p = 0.01970$ $\delta_r = 0.15054$ $\frac{U_\delta}{U_o} = 1.00344$

$a = 0.35300$ $\delta_a = 0.23037$ $b = 0.17600$ $\delta_b = 0.15054$

TABLE 5 (Continued)

(f) x/L = 0.907

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0052	0.609	-0.049	-0.023	0.061	0.031	0.035	0.0772	0.0153	0.133	0.026	0.0371	0.0005	0.0027	0.0015
0.0127	0.685	-0.058	-0.023	0.060	0.032	0.043	0.0709	0.0145	0.109	0.022	0.0894	0.0040	0.0210	0.0114
0.0159	0.712	-0.059	-0.022	0.058	0.033	0.042	0.0732	0.0122	0.118	0.020	0.1122	0.0052	0.0272	0.0148
0.0210	0.738	-0.062	-0.021	0.056	0.032	0.041	0.0643	0.0085	0.110	0.015	0.1486	0.0069	0.0387	0.0211
0.0281	0.768	-0.064	-0.022	0.054	0.031	0.041	0.0602	0.0060	0.109	0.011	0.1987	0.0084	0.0485	0.0264
0.0365	0.791	-0.064	-0.023	0.051	0.030	0.041	0.0541	0.0078	0.105	0.015	0.2578	0.0095	0.0575	0.0313
0.0574	0.856	-0.065	-0.025	0.045	0.027	0.038	0.0426	0.0086	0.101	0.020	0.4058	0.0075	0.0510	0.0278
0.0677	0.884	-0.066	-0.025	0.041	0.026	0.035	0.0376	0.0085	0.104	0.024	0.4786	0.0077	0.0565	0.0307
0.0829	0.913	-0.066	-0.027	0.037	0.023	0.032	0.0275	0.0033	0.096	0.011	0.5855	0.0059	0.0502	0.0273
0.0935	0.941	-0.066	-0.029	0.032	0.020	0.028	0.0193	0.0009	0.088	0.004	0.6606	0.0045	0.0456	0.0248
0.1093	0.965	-0.064	-0.028	0.025	0.016	0.022	0.0106	0.0025	0.076	0.018	0.7721	0.0041	0.0562	0.0306
0.1276	0.984	-0.062	-0.028	0.014	0.011	0.014	0.0025	-0.0004	0.050	-0.007	0.9018	0.0016	0.0452	0.0246
0.1637	0.992	-0.057	-0.028	0.004	0.004	0.023								
0.2233	0.993	-0.049	-0.028	0.003	0.002	0.014								
0.2913	0.994	-0.041	-0.026	0.003	0.001	0.003								
0.3563	0.995	-0.034	-0.025	0.003	0.001	0.001								
0.4240	0.998	-0.029	-0.024	0.003	0.001	0.001								

$\delta_p^* =$ 0.02014 $\delta_r =$ 0.14154 $\frac{U_\delta}{U_o} =$ 0.99300

$a =$ 0.32200 $\delta_a =$ 0.27262 $b =$ 0.16100 $\delta_b =$ 0.14154

TABLE 5 (Continued)

(g) x/L = 0.914

n_e (ft)	$\frac{u_x}{U_e}$	$\frac{v_n}{U_e}$	$\frac{v_\theta}{U_e}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_e}$	$100\frac{-\overline{u_x'v_n'}}{U_e^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_e^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.612	-0.049	-0.009	0.059	0.032	0.043	0.0615	0.0076	0.098	0.012	0.0554	0.0007	0.0051	0.0028
0.0130	0.642	-0.055	-0.006	0.059	0.032	0.041	0.0687	-0.0005	0.111	-0.001	0.0919	0.0048	0.0341	0.0191
0.0175	0.665	-0.057	-0.007	0.058	0.032	0.041	0.0660	-0.0023	0.107	-0.004	0.1238	0.0049	0.0350	0.0195
0.0227	0.693	-0.059	-0.006	0.058	0.032	0.041	0.0618	-0.0026	0.103	-0.004	0.1603	0.0044	0.0328	0.0184
0.0313	0.738	-0.062	-0.006	0.054	0.031	0.040	0.0492	-0.0026	0.089	-0.005	0.2218	0.0042	0.0353	0.0197
0.0391	0.767	-0.062	-0.005	0.051	0.030	0.039	0.0469	-0.0053	0.093	-0.011	0.2765	0.0052	0.0445	0.0249
0.0471	0.792	-0.061	-0.005	0.049	0.030	0.038	0.0454	-0.0065	0.097	-0.014	0.3335	0.0058	0.0504	0.0282
0.0561	0.818	-0.062	-0.006	0.046	0.028	0.037	0.0420	-0.0058	0.098	-0.013	0.3973	0.0050	0.0452	0.0253
0.0648	0.849	-0.062	-0.007	0.042	0.027	0.035	0.0377	-0.0107	0.101	-0.029	0.4589	0.0050	0.0479	0.0268
0.0777	0.873	-0.061	-0.009	0.039	0.025	0.033	0.0285	-0.0052	0.089	-0.016	0.5500	0.0053	0.0585	0.0327
0.0909	0.902	-0.061	-0.009	0.033	0.021	0.028	0.0200	-0.0036	0.086	-0.016	0.6435	0.0041	0.0533	0.0298
0.1009	0.919	-0.060	-0.008	0.030	0.020	0.024	0.0156	-0.0038	0.085	-0.021	0.7141	0.0036	0.0529	0.0295
0.1144	0.941	-0.058	-0.009	0.022	0.015	0.019	0.0068	-0.0047	0.064	-0.044	0.8098	0.0021	0.0469	0.0262
0.1267	0.952	-0.056	-0.009	0.017	0.013	0.014	0.0029	-0.0027	0.046	-0.043	0.8965	0.0016	0.0545	0.0305
0.1421	0.960	-0.054	-0.009	0.010	0.008	0.001								
0.1686	0.962	-0.049	-0.008	0.004	0.004	0.001								
0.1898	0.963	-0.046	-0.009	0.003	0.003	0.001								
0.2417	0.965	-0.039	-0.010	0.002	0.002	0.001								
0.2935	0.967	-0.032	-0.010	0.002	0.002	0.001								
0.3689	0.968	-0.025	-0.010	0.002	0.001	0.000								
0.4520	0.971	-0.017	-0.010	0.002	0.002	0.000								
0.4987	0.971	-0.019	-0.010	0.002	0.002	0.000								

$\delta_p^* =$ 0.02614 $\delta_r =$ 0.14132 $\frac{U_\delta}{U_e} =$ 0.99800

$a =$ 0.30000 $\delta_a =$ 0.27348 $b =$ 0.15000 $\delta_b =$ 0.14132

TABLE 5 (Continued)

(h) x/L = 0.934

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.559	-0.078	-0.015	0.061	0.033	0.041	0.0876	0.0114	0.137	0.018	0.0568	0.0015	0.0096	0.0060
0.0110	0.579	-0.079	-0.014	0.060	0.034	0.040	0.0862	0.0073	0.136	0.012	0.0689	0.0027	0.0169	0.0106
0.0136	0.609	-0.081	-0.012	0.060	0.033	0.040	0.0818	0.0046	0.130	0.007	0.0850	0.0024	0.0156	0.0098
0.0162	0.638	-0.081	-0.012	0.058	0.033	0.040	0.0718	0.0066	0.119	0.011	0.1011	0.0030	0.0203	0.0128
0.0207	0.652	-0.081	-0.011	0.057	0.033	0.040	0.0715	0.0039	0.120	0.007	0.1293	0.0066	0.0451	0.0284
0.0265	0.678	-0.082	-0.010	0.054	0.033	0.040	0.0662	-0.0003	0.118	-0.001	0.1655	0.0053	0.0376	0.0237
0.0326	0.703	-0.079	-0.011	0.054	0.032	0.040	0.0621	0.0089	0.113	0.016	0.2038	0.0061	0.0445	0.0281
0.0423	0.729	-0.078	-0.012	0.052	0.031	0.040	0.0576	0.0015	0.109	0.003	0.2642	0.0065	0.0500	0.0315
0.0529	0.764	-0.076	-0.012	0.047	0.030	0.039	0.0470	0.0062	0.101	0.013	0.3306	0.0053	0.0446	0.0281
0.0658	0.799	-0.074	-0.012	0.044	0.028	0.037	0.0428	-0.0043	0.104	-0.011	0.4112	0.0059	0.0519	0.0327
0.0783	0.828	-0.072	-0.014	0.042	0.027	0.035	0.0399	-0.0029	0.108	-0.008	0.4897	0.0058	0.0535	0.0337
0.0909	0.858	-0.069	-0.015	0.037	0.024	0.033	0.0325	-0.0004	0.106	-0.001	0.5682	0.0050	0.0509	0.0321
0.1070	0.890	-0.066	-0.014	0.032	0.021	0.028	0.0236	-0.0028	0.106	-0.012	0.6689	0.0042	0.0506	0.0319
0.1254	0.923	-0.064	-0.015	0.023	0.016	0.021	0.0104	-0.0027	0.085	-0.022	0.7837	0.0026	0.0476	0.0300
0.1463	0.940	-0.059	-0.015	0.013	0.010	0.013	0.0018	-0.0019	0.040	-0.042	0.9145	0.0010	0.0413	0.0260
0.1801	0.951	-0.052	-0.015	0.005	0.004	0.001								
0.2349	0.956	-0.043	-0.016	0.004	0.002	0.001								
0.2970	0.960	-0.034	-0.016	0.004	0.001	0.001								
0.3879	0.967	-0.023	-0.015	0.004	0.001	0.001								
0.4191	0.971	-0.005	-0.014	0.004	0.001	0.001								

$\delta_p^* = 0.03007$ $\quad \delta_r = 0.15997$ $\quad \frac{U_\delta}{U_o} = 0.97500$

$a = 0.23600$ $\quad \delta_a = 0.32512$ $\quad b = 0.11800$ $\quad \delta_b = 0.15997$

TABLE 5 (Continued)

(l) x/L = 0.944

n_e (ft)	$\frac{u_x}{U_e}$	$\frac{v_n}{U_e}$	$\frac{v_\theta}{U_e}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_e}$	$100\,\frac{\overline{-u_x'v_n'}}{U_e^2}$	$100\,\frac{\overline{-u_x'v_\theta'}}{U_e^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.513	-0.074	-0.013	0.060	0.033	0.040	0.0838	0.0110	0.132	0.017	0.0458	0.0012	0.0070	0.0048
0.0104	0.541	-0.076	-0.010	0.059	0.033	0.041	0.0828	0.0029	0.132	0.005	0.0609	0.0022	0.0131	0.0091
0.0133	0.585	-0.078	-0.008	0.058	0.033	0.041	0.0758	-0.0003	0.126	-0.001	0.0778	0.0023	0.0143	0.0099
0.0188	0.606	-0.076	-0.007	0.058	0.032	0.040	0.0734	0.0022	0.122	0.004	0.1098	0.0061	0.0392	0.0271
0.0272	0.642	-0.076	-0.006	0.056	0.033	0.041	0.0689	0.0007	0.118	0.001	0.1588	0.0043	0.0284	0.0196
0.0326	0.675	-0.075	-0.007	0.054	0.032	0.041	0.0587	-0.0004	0.105	-0.001	0.1908	0.0039	0.0280	0.0193
0.0400	0.702	-0.073	-0.007	0.053	0.032	0.040	0.0648	-0.0009	0.119	-0.002	0.2341	0.0059	0.0401	0.0277
0.0484	0.734	-0.071	-0.008	0.050	0.030	0.040	0.0545	-0.0013	0.109	-0.003	0.2830	0.0055	0.0410	0.0283
0.0636	0.770	-0.069	-0.008	0.046	0.029	0.038	0.0497	-0.0002	0.112	-0.000	0.3715	0.0058	0.0457	0.0315
0.0729	0.800	-0.066	-0.008	0.045	0.028	0.037	0.0450	0.0010	0.109	0.002	0.4261	0.0057	0.0464	0.0320
0.0871	0.827	-0.065	-0.010	0.041	0.026	0.035	0.0398	-0.0030	0.110	-0.008	0.5090	0.0060	0.0521	0.0360
0.1003	0.860	-0.062	-0.010	0.036	0.024	0.032	0.0299	-0.0021	0.105	-0.007	0.5862	0.0044	0.0446	0.0308
0.1132	0.887	-0.060	-0.011	0.033	0.021	0.028	0.0252	-0.0028	0.110	-0.012	0.6615	0.0044	0.0485	0.0335
0.1312	0.918	-0.057	-0.011	0.025	0.017	0.022	0.0102	-0.0034	0.073	-0.025	0.7670	0.0024	0.0414	0.0286
0.1496	0.938	-0.053	-0.011	0.017	0.012	0.016	0.0048	-0.0028	0.069	-0.040	0.8743	0.0018	0.0454	0.0314
0.1885	0.955	-0.046	-0.010	0.004	0.004	0.002								
0.2356	0.961	-0.038	-0.010	0.003	0.002	0.001								
0.3029	0.967	-0.029	-0.010	0.003	0.001	0.001								
0.3705	0.973	-0.022	-0.010	0.003	0.001	0.001								
0.4378	0.979	-0.009	-0.009	0.003	0.001	0.001								

$\delta_p^* =$ 0.03100 $\quad \delta_r =$ 0.17106 $\quad \frac{U_\delta}{U_0} =$ 0.96050

$a =$ 0.20000 $\quad \delta_a =$ 0.33529 $\quad b =$ 0.10000 $\quad \delta_b =$ 0.17106

TABLE 5 (Continued)

(j) x/L = 0.956

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\,\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\,\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0052	0.441	-0.065	-0.000	0.059	0.032	0.011	0.0842	-0.0055	0.185	-0.012	0.0294	0.0006	0.0041	0.0031
0.0085	0.480	-0.069	-0.000	0.059	0.035	0.017	0.0904	-0.0088	0.181	-0.018	0.0475	0.0026	0.0165	0.0123
0.0130	0.514	-0.070	-0.000	0.059	0.034	0.026	0.0861	-0.0136	0.162	-0.025	0.0728	0.0035	0.0223	0.0166
0.0165	0.540	-0.070	-0.001	0.058	0.034	0.033	0.0826	-0.0173	0.145	-0.030	0.0926	0.0036	0.0235	0.0175
0.0204	0.564	-0.069	-0.001	0.057	0.034	0.041	0.0768	-0.0213	0.125	-0.035	0.1143	0.0041	0.0278	0.0206
0.0268	0.592	-0.069	0.003	0.056	0.034	0.041	0.0739	-0.0214	0.123	-0.036	0.1504	0.0053	0.0370	0.0275
0.0323	0.614	-0.067	0.004	0.056	0.033	0.041	0.0720	-0.0232	0.121	-0.039	0.1811	0.0053	0.0372	0.0276
0.0445	0.668	-0.065	0.005	0.053	0.032	0.041	0.0614	-0.0181	0.111	-0.033	0.2497	0.0043	0.0329	0.0245
0.0555	0.712	-0.062	0.005	0.050	0.031	0.040	0.0525	-0.0185	0.105	-0.037	0.3111	0.0054	0.0445	0.0331
0.0632	0.728	-0.061	0.006	0.049	0.030	0.039	0.0597	-0.0112	0.122	-0.023	0.3544	0.0076	0.0585	0.0435
0.0764	0.765	-0.058	0.006	0.045	0.029	0.038	0.0460	-0.0175	0.108	-0.041	0.4284	0.0051	0.0451	0.0335
0.0893	0.798	-0.056	0.006	0.043	0.027	0.037	0.0399	-0.0109	0.102	-0.028	0.5007	0.0049	0.0460	0.0341
0.1074	0.840	-0.053	0.006	0.038	0.025	0.033	0.0344	-0.0095	0.112	-0.031	0.6018	0.0049	0.0502	0.0373
0.1231	0.869	-0.051	0.006	0.034	0.022	0.029	0.0273	-0.0070	0.110	-0.028	0.6902	0.0046	0.0525	0.0390
0.1412	0.899	-0.049	0.006	0.027	0.018	0.024	0.0157	-0.0069	0.096	-0.042	0.7913	0.0031	0.0472	0.0351
0.1586	0.922	-0.046	0.007	0.020	0.014	0.019	0.0071	-0.0037	0.076	-0.040	0.8888	0.0020	0.0443	0.0329
0.1827	0.940	-0.042	0.007	0.008	0.008	0.001								
0.2269	0.949	-0.037	0.007	0.003	0.003	0.001								
0.3309	0.960	-0.025	0.005	0.003	0.001	0.001								
0.3905	0.964	-0.020	0.006	0.003	0.001	0.001								
0.4658	0.972	0.002	0.006	0.003	0.001	0.001								

$\delta^*_p =$ 0.03554 $\quad \delta_r =$ 0.17840 $\quad \frac{U_\delta}{U_o} =$ 0.94700

$a =$ 0.15400 $\quad \delta_a =$ 0.37296 $\quad b =$ 0.07700 $\quad \delta_b =$ 0.17840

TABLE 6 - MEASURED MEAN AND TURBULENT VELOCITY CHARACTERISTICS FOR VARYING AXIAL LOCATIONS ALONG 67° PLANE

(a) x/L = 0.894

n_e (ft)	$\frac{u_x}{U_e}$	$\frac{v_n}{U_e}$	$\frac{v_\theta}{U_e}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_e}$	$100\frac{\overline{-u_x'v_n'}}{U_\delta^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_\delta^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta\delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.574	0.073	-0.011	0.064	0.037	0.042	0.1130	-0.0148	0.157	-0.021	0.0470	0.0012	0.0057	0.0036
0.0120	0.637	-0.077	-0.006	0.062	0.037	0.040	0.1088	-0.0161	0.159	-0.023	0.0721	0.0034	0.0170	0.0108
0.0194	0.679	-0.079	0.003	0.060	0.037	0.041	0.1096	-0.0154	0.164	-0.023	0.1165	0.0072	0.0359	0.0229
0.0217	0.691	-0.080	0.003	0.059	0.037	0.041	0.1051	-0.0177	0.162	-0.027	0.1300	0.0077	0.0396	0.0252
0.0268	0.709	-0.080	0.006	0.059	0.036	0.041	0.0959	-0.0185	0.148	-0.029	0.1609	0.0087	0.0468	0.0298
0.0362	0.753	-0.081	0.009	0.056	0.035	0.041	0.0906	-0.0157	0.150	-0.026	0.2168	0.0089	0.0491	0.0313
0.0439	0.775	-0.080	0.010	0.054	0.035	0.040	0.0794	-0.0138	0.139	-0.024	0.2632	0.0108	0.0633	0.0403
0.0536	0.799	-0.079	0.011	0.052	0.033	0.039	0.0785	-0.0105	0.145	-0.019	0.3211	0.0098	0.0579	0.0369
0.0610	0.823	-0.079	0.013	0.050	0.032	0.037	0.0704	-0.0113	0.144	-0.023	0.3655	0.0079	0.0492	0.0313
0.0684	0.847	-0.078	0.015	0.048	0.031	0.036	0.0639	-0.0117	0.142	-0.026	0.4099	0.0079	0.0516	0.0328
0.0832	0.881	-0.077	0.016	0.044	0.028	0.033	0.0517	-0.0118	0.136	-0.031	0.4987	0.0078	0.0569	0.0362
0.1006	0.924	-0.074	0.018	0.036	0.025	0.029	0.0348	-0.0107	0.127	-0.039	0.6030	0.0062	0.0553	0.0352
0.1151	0.948	-0.071	0.019	0.032	0.021	0.024	0.0257	-0.0087	0.126	-0.043	0.6898	0.0062	0.0638	0.0406
0.1421	0.982	-0.066	0.020	0.018	0.014	0.016	0.0068	-0.0051	0.088	-0.066	0.8520	0.0029	0.0574	0.0366
0.1840	0.994	-0.057	0.021	0.004	0.004	0.001								
0.2533	0.995	-0.045	0.021	0.002	0.002	0.001								
0.3151	0.996	-0.037	0.022	0.002	0.001	0.001								
0.4311	0.996	-0.024	0.025	0.002	0.001	0.001								
0.5696	0.999	-0.016	0.027	0.002	0.001	0.001								
0.6881	1.001	-0.010	0.029	0.002	0.001	0.001								

$\delta_p^* =$ 0.02755 $\quad \delta_r =$ 0.16684 $\quad \frac{U_\delta}{U_0} =$ 1.00456

$a =$ 0.35300 $\quad \delta_a =$ 0.23037 $\quad b =$ 0.17600 $\quad \delta_b =$ 0.15054

TABLE 6 (Continued)

(b) x/L = 0.914

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\,\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\,\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.528	-0.071	-0.024	0.063	0.037	0.040	0.1162	-0.0180	0.169	-0.026	0.0525	0.0013	0.0068	0.0047
0.0146	0.589	-0.077	-0.017	0.062	0.038	0.040	0.1191	-0.0219	0.174	-0.032	0.0840	0.0042	0.0219	0.0151
0.0175	0.612	-0.079	-0.016	0.060	0.037	0.040	0.1099	-0.0225	0.166	-0.034	0.1007	0.0053	0.0287	0.0197
0.0230	0.635	-0.079	-0.010	0.059	0.036	0.041	0.1080	-0.0267	0.165	-0.041	0.1322	0.0074	0.0400	0.0275
0.0326	0.691	-0.081	-0.004	0.058	0.037	0.041	0.0984	-0.0229	0.155	-0.036	0.1879	0.0063	0.0357	0.0245
0.0423	0.733	-0.082	0.002	0.055	0.035	0.040	0.0875	-0.0193	0.151	-0.033	0.2435	0.0074	0.0445	0.0306
0.0549	0.772	-0.082	0.004	0.052	0.034	0.039	0.0811	-0.0200	0.150	-0.037	0.3158	0.0094	0.0589	0.0405
0.0693	0.807	-0.080	0.007	0.050	0.032	0.038	0.0789	-0.0179	0.159	-0.036	0.3993	0.0103	0.0654	0.0449
0.0816	0.838	-0.080	0.009	0.048	0.031	0.036	0.0667	-0.0170	0.147	-0.038	0.4698	0.0078	0.0542	0.0372
0.0964	0.882	-0.078	0.011	0.041	0.027	0.033	0.0509	-0.0169	0.144	-0.048	0.5551	0.0074	0.0590	0.0405
0.1112	0.903	-0.076	0.013	0.039	0.026	0.029	0.0433	-0.0133	0.145	-0.044	0.6404	0.0070	0.0602	0.0413
0.1238	0.934	-0.074	0.014	0.033	0.022	0.024	0.0306	-0.0107	0.143	-0.050	0.7127	0.0052	0.0530	0.0364
0.1383	0.952	-0.072	0.015	0.028	0.019	0.019	0.0204	-0.0084	0.132	-0.054	0.7962	0.0051	0.0635	0.0436
0.1557	0.976	-0.068	0.016	0.018	0.013	0.013	0.0061	-0.0050	0.091	-0.074	0.8963	0.0021	0.0481	0.0330
0.1776	0.984	-0.063	0.016	0.008	0.008	0.006								
0.2172	0.986	-0.055	0.016	0.003	0.003	0.002								
0.2813	0.989	-0.044	0.018	0.002	0.001	0.001								
0.4291	0.992	-0.026	0.021	0.002	0.001	0.001								
0.5908	0.995	-0.016	0.022	0.002	0.001	0.001								
0.7187	1.003	-0.013	0.022	0.002	0.001	0.001								

$\delta_p^* =$ 0.03143 $\delta_r =$ 0.17368 $\frac{U_\delta}{U_o} =$ 0.98720

$a =$ 0.30000 $\delta_a =$ 0.27348 $b =$ 0.15000 $\delta_b =$ 0.14132

TABLE 6 (Continued)

(c) x/L = 0.944

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.440	-0.084	-0.029	0.058	0.036	0.040	0.1178	-0.0317	0.189	-0.051	0.0445	0.0015	0.0086	0.0071
0.0139	0.461	-0.087	-0.019	0.060	0.037	0.041	0.1245	-0.0401	0.189	-0.061	0.0682	0.0039	0.0219	0.0181
0.0188	0.516	-0.090	-0.015	0.059	0.036	0.041	0.1128	-0.0382	0.175	-0.059	0.0918	0.0030	0.0179	0.0148
0.0265	0.560	-0.089	-0.011	0.058	0.036	0.041	0.1009	-0.0349	0.160	-0.055	0.1295	0.0062	0.0389	0.0322
0.0336	0.577	-0.089	-0.009	0.058	0.036	0.041	0.1047	-0.0317	0.165	-0.050	0.1641	0.0063	0.0392	0.0324
0.0410	0.620	-0.089	-0.004	0.056	0.036	0.040	0.0898	-0.0282	0.149	-0.047	0.2003	0.0045	0.0299	0.0247
0.0484	0.650	-0.088	-0.002	0.056	0.036	0.040	0.0929	-0.0345	0.156	-0.058	0.2365	0.0061	0.0401	0.0331
0.0584	0.682	-0.085	0.003	0.055	0.036	0.039	0.0847	-0.0279	0.146	-0.048	0.2853	0.0065	0.0446	0.0369
0.0684	0.713	-0.084	0.006	0.054	0.035	0.039	0.0816	-0.0253	0.145	-0.045	0.3341	0.0066	0.0460	0.0380
0.0780	0.742	-0.083	0.008	0.052	0.033	0.039	0.0772	-0.0254	0.144	-0.047	0.3813	0.0065	0.0467	0.0386
0.0903	0.777	-0.081	0.011	0.049	0.032	0.037	0.0705	-0.0179	0.144	-0.037	0.4411	0.0064	0.0484	0.0400
0.1003	0.802	-0.079	0.012	0.046	0.031	0.036	0.0575	-0.0192	0.132	-0.044	0.4899	0.0055	0.0461	0.0381
0.1148	0.839	-0.076	0.015	0.044	0.029	0.033	0.0538	-0.0196	0.139	-0.051	0.5607	0.0059	0.0506	0.0419
0.1296	0.868	-0.075	0.017	0.041	0.027	0.031	0.0439	-0.0179	0.132	-0.054	0.6331	0.0061	0.0582	0.0481
0.1444	0.891	-0.072	0.018	0.037	0.024	0.027	0.0349	-0.0124	0.130	-0.046	0.7055	0.0051	0.0541	0.0447
0.1615	0.922	-0.070	0.020	0.032	0.021	0.021	0.0259	-0.0096	0.138	-0.051	0.7889	0.0039	0.0488	0.0403
0.1837	0.952	-0.066	0.022	0.021	0.015	0.014	0.0076	-0.0053	0.088	-0.062	0.8975	0.0017	0.0393	0.0325
0.2085	0.971	-0.060	0.023	0.008	0.007	0.001								
0.2356	0.976	-0.056	0.022	0.004	0.004	0.001								
0.2674	0.979	-0.050	0.023	0.003	0.002	0.001								
0.3911	0.986	-0.035	0.024	0.002	0.001	0.001								
0.5551	0.993	-0.023	0.027	0.002	0.001	0.001								
0.7773	1.004	-0.015	0.009	0.002	0.001	0.000								

$\delta^*_p = 0.04256$ $\delta_r = 0.20467$ $\frac{U_\delta}{U_o} = 0.96050$

$a = 0.20000$ $\delta_a = 0.33529$ $b = 0.10000$ $\delta_b = 0.17106$

TABLE 6 (Continued)

(d) x/L = 0.956

n_0 (ft)	$\frac{u_x}{U_0}$	$\frac{v_n}{U_0}$	$\frac{v_\theta}{U_0}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_0}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_0}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_0}$	$100\frac{-\overline{u_x'v_n'}}{U_0^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_0^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_0}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.387	-0.063	-0.025	0.057	0.035	0.033	0.1064	-0.0233	0.190	-0.042	0.0352	0.0009	0.0053	0.0049
0.0127	0.458	-0.069	-0.027	0.059	0.037	0.039	0.1169	-0.0289	0.185	-0.046	0.0569	0.0032	0.0180	0.0167
0.0165	0.472	-0.069	-0.024	0.058	0.037	0.040	0.1144	-0.0309	0.180	-0.049	0.0743	0.0045	0.0259	0.0240
0.0204	0.503	-0.070	-0.020	0.059	0.037	0.041	0.1156	-0.0380	0.176	-0.058	0.0916	0.0042	0.0238	0.0220
0.0262	0.526	-0.072	-0.014	0.059	0.037	0.041	0.1114	-0.0441	0.170	-0.067	0.1177	0.0048	0.0277	0.0257
0.0301	0.551	-0.070	-0.011	0.058	0.037	0.042	0.1120	-0.0426	0.171	-0.065	0.1350	0.0048	0.0278	0.0257
0.0375	0.578	-0.070	-0.009	0.057	0.036	0.042	0.1013	-0.0393	0.160	-0.062	0.1683	0.0063	0.0382	0.0354
0.0471	0.615	-0.070	-0.006	0.056	0.036	0.041	0.1001	-0.0374	0.163	-0.061	0.2117	0.0064	0.0391	0.0363
0.0645	0.673	-0.069	0.002	0.053	0.035	0.041	0.0881	-0.0264	0.154	-0.046	0.2899	0.0066	0.0434	0.0403
0.0793	0.715	-0.068	0.003	0.052	0.034	0.040	0.0807	-0.0372	0.148	-0.068	0.3565	0.0071	0.0483	0.0448
0.0938	0.751	-0.067	0.008	0.050	0.033	0.038	0.0764	-0.0288	0.151	-0.057	0.4216	0.0066	0.0466	0.0432
0.1161	0.817	-0.064	0.012	0.044	0.030	0.035	0.0622	-0.0227	0.152	-0.055	0.5214	0.0059	0.0458	0.0425
0.1431	0.865	-0.061	0.015	0.038	0.026	0.030	0.0435	-0.0155	0.145	-0.051	0.6430	0.0064	0.0595	0.0552
0.1653	0.897	-0.058	0.016	0.034	0.022	0.025	0.0317	-0.0125	0.141	-0.056	0.7428	0.0046	0.0507	0.0470
0.1750	0.913	-0.057	0.016	0.030	0.020	0.022	0.0229	-0.0111	0.128	-0.062	0.7862	0.0034	0.0441	0.0409
0.2017	0.946	-0.053	0.018	0.019	0.013	0.013	0.0078	-0.0048	0.110	-0.068	0.9064	0.0021	0.0451	0.0418
0.2240	0.959	-0.049	0.019	0.009	0.008	0.001								
0.2510	0.964	-0.044	0.019	0.004	0.004	0.001								
0.3721	0.973	-0.029	0.019	0.002	0.001	0.001								
0.4787	0.979	-0.023	0.020	0.002	0.001	0.001								
0.6292	0.986	-0.014	0.022	0.002	0.001	0.000								
0.7947	0.992	-0.010	0.023	0.002	0.001	0.000								

$\delta_p^* = 0.04566$ $\quad \delta_r = 0.22258$ $\quad \frac{U_\delta}{U_0} = 0.94700$

$a = 0.15400$ $\quad \delta_a = 0.37296$ $\quad b = 0.07700$ $\quad \delta_b = 0.17840$

TABLE 7 - MEASURED MEAN AND TURBULENT VELOCITY CHARACTERISTICS FOR x/L = 0.956 ALONG 77° PLANE

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\,\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\,\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.339	-0.086	-0.037	0.049	0.032	0.034	0.0863	-0.0151	0.188	0.033	0.0345	0.0010	0.0078	0.0086
0.0139	0.349	-0.085	-0.034	0.049	0.033	0.036	0.0966	-0.0257	0.199	0.053	0.0527	0.0031	0.0219	0.0241
0.0188	0.391	-0.088	-0.031	0.050	0.033	0.037	0.0881	-0.0349	0.176	-0.070	0.0710	0.0019	0.0141	0.0156
0.0262	0.441	-0.090	-0.025	0.053	0.035	0.039	0.0927	-0.0455	0.167	0.082	0.0990	0.0027	0.0195	0.0215
0.0336	0.470	-0.091	-0.021	0.054	0.035	0.040	0.0933	-0.0493	0.161	0.085	0.1270	0.0033	0.0241	0.0265
0.0436	0.523	-0.088	-0.017	0.055	0.035	0.040	0.0911	-0.0420	0.154	0.071	0.1648	0.0038	0.0281	0.0310
0.0510	0.551	-0.088	0.013	0.054	0.035	0.040	0.0836	-0.0402	0.145	-0.069	0.1928	0.0036	0.0279	0.0307
0.0632	0.602	-0.084	-0.006	0.053	0.036	0.040	0.0779	-0.0417	0.137	0.073	0.2391	0.0048	0.0380	0.0418
0.0719	0.617	-0.083	-0.004	0.053	0.035	0.040	0.0795	-0.0385	0.141	0.068	0.2720	0.0061	0.0483	0.0532
0.0890	0.669	-0.080	0.002	0.051	0.035	0.040	0.0729	-0.0336	0.134	0.062	0.3365	0.0043	0.0356	0.0392
0.1051	0.713	-0.076	0.005	0.050	0.034	0.038	0.0688	-0.0358	0.134	-0.070	0.3974	0.0047	0.0400	0.0440
0.1222	0.751	0.075	0.007	0.047	0.033	0.037	0.0582	-0.0342	0.124	0.073	0.4620	0.0040	0.0369	0.0406
0.1370	0.791	0.071	0.007	0.045	0.030	0.035	0.0514	-0.0278	0.123	0.067	0.5180	0.0041	0.0407	0.0448
0.1541	0.815	-0.071	0.008	0.042	0.029	0.033	0.0424	-0.0224	0.113	0.060	0.5826	0.0043	0.0460	0.0507
0.1692	0.844	0.067	0.010	0.040	0.028	0.030	0.0399	-0.0195	0.121	0.059	0.6398	0.0039	0.0434	0.0478
0.1876	0.872	-0.065	0.011	0.035	0.024	0.026	0.0292	-0.0151	0.115	0.059	0.7092	0.0032	0.0421	0.0464
0.2059	0.900	-0.063	0.012	0.031	0.021	0.022	0.0225	-0.0122	0.120	-0.065	0.7787	0.0028	0.0417	0.0459
0.2230	0.921	-0.061	0.013	0.027	0.018	0.018	0.0156	-0.0089	0.116	0.066	0.8432	0.0023	0.0418	0.0460
0.2433	0.942	-0.057	0.013	0.018	0.013	0.012	0.0052	-0.0047	0.083	-0.074	0.9200	0.0011	0.0335	0.0369
0.2626	0.954	-0.054	0.013	0.010	0.008	0.007	0.0010	-0.0018	0.044	-0.079	0.9930	0.0004	0.0258	0.0284
0.2948	0.961	-0.050	0.012	0.004	0.004	0.001								
0.3293	0.963	-0.046	0.012	0.003	0.002	0.001								
0.3960	0.968	-0.039	0.012	0.002	0.001	0.001								
0.4858	0.973	-0.032	0.012	0.002	0.001	0.000								
0.6034	0.979	-0.024	0.014	0.002	0.001	0.000								
0.7818	0.989	-0.020	0.013	0.002	0.001	0.000								

$\delta^*_p = 0.06218$ $\delta_r = 0.26445$ $\frac{U_\delta}{U_0} = 0.94760$

$a = 0.15400$ $\delta_a = 0.37296$ $b = 0.07700$ $\delta_b = 0.17840$

TABLE 8 - MEASURED MEAN AND TURBULENT VELOCITY CHARACTERISTICS FOR VARYING AXIAL LOCATIONS ALONG 80° PLANE

(a) x/L = 0.497

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$100\,\frac{-\overline{u_x' v_n'}}{U_o^2}$	$\frac{-\overline{u_x' v_n'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.6\delta_a)(b+0.6\delta_b)-ab}}$
0.0052	0.721	-0.004	0.061	0.030	0.0256	0.056	0.0968	0.0004	0.0033	0.0008
0.0136	0.847	-0.000	0.051	0.028	0.0265	0.079	0.2513	0.0035	0.0285	0.0067
0.0220	0.897	0.003	0.045	0.025	0.0203	0.078	0.4057	0.0061	0.0568	0.0134
0.0272	0.916	0.002	0.042	0.024	0.0147	0.063	0.5008	0.0050	0.0550	0.0130
0.0304	0.930	0.003	0.039	0.023	0.0134	0.064	0.5602	0.0040	0.0456	0.0107
0.0381	0.975	0.002	0.028	0.018	0.0040	0.037	0.7028	0.0014	0.0291	0.0068
0.0452	0.992	0.003	0.021	0.014	0.0017	0.027	0.8335	0.0011	0.0367	0.0086
0.0552	1.007	0.003	0.009	0.008						
0.0700	1.010	0.004	0.004	0.004						
0.0797	1.009	0.004	0.003	0.003						
0.2694	1.008	0.008	0.002	0.001						
0.4581	1.010	0.013	0.002	0.001						

$\delta^*_p =$ 0.00726 $\delta_r =$ 0.05422 $\frac{U_\delta}{U_o} =$ 0.99560

$a =$ 0.64800 $\delta_a =$ 0.10498 $b =$ 0.32400 $\delta_b =$ 0.07631

TABLE 8 (Continued)

(b) x/L = 0.767

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\,\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\,\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.6\delta_a)(b+0.6\delta_b)-ab}}$
0.0078	0.731	-0.027	-0.011	0.061	0.034	0.032	0.0706	-0.0001	0.119	-0.000	0.0777	0.0017	0.0083	0.0035
0.0104	0.761	-0.031	-0.015	0.061	0.034	0.043	0.0648	-0.0001	0.097	-0.000	0.1032	0.0050	0.0259	0.0109
0.0127	0.779	-0.032	-0.014	0.060	0.034	0.044	0.0694	0.0010	0.104	0.001	0.1256	0.0068	0.0337	0.0142
0.0175	0.814	-0.033	-0.011	0.056	0.033	0.041	0.0566	0.0039	0.095	0.006	0.1735	0.0067	0.0368	0.0154
0.0233	0.846	-0.035	-0.011	0.053	0.032	0.042	0.0484	0.0015	0.087	0.003	0.2310	0.0077	0.0461	0.0194
0.0307	0.874	-0.037	-0.012	0.049	0.031	0.039	0.0442	0.0022	0.090	0.004	0.3044	0.0078	0.0486	0.0204
0.0391	0.914	-0.037	-0.011	0.045	0.028	0.038	0.0379	-0.0038	0.089	-0.009	0.3875	0.0082	0.0554	0.0233
0.0494	0.934	-0.038	-0.012	0.042	0.027	0.035	0.0334	-0.0025	0.089	-0.007	0.4897	0.0093	0.0672	0.0282
0.0597	0.970	-0.037	-0.013	0.035	0.024	0.031	0.0214	-0.0011	0.078	-0.004	0.5919	0.0054	0.0486	0.0204
0.0752	1.003	-0.036	-0.013	0.025	0.018	0.023	0.0098	-0.0032	0.066	-0.022	0.7452	0.0045	0.0605	0.0254
0.0880	1.018	-0.035	-0.013	0.015	0.012	0.016	0.0019	-0.0030	0.030	-0.048	0.8729	0.0016	0.0482	0.0203
0.1141	1.027	-0.031	-0.012	0.005	0.004	0.008								
0.1843	1.027	-0.024	-0.012	0.004	0.001	0.001								
0.2417	1.026	-0.020	-0.015	0.004	0.001	0.001								
0.3541	1.024	-0.013	-0.021	0.004	0.001	0.000								
0.4472	1.023	-0.009	-0.027	0.004	0.001	0.000								
0.4916	1.023	-0.008	-0.030	0.004	0.001	0.000								

$\delta^*_p = 0.01297$ $\delta_r = 0.10085$ $\frac{U_\delta}{U_o} = 1.02139$

$a = 0.58000$ $\delta_a = 0.11447$ $b = 0.29000$ $\delta_b = 0.09683$

TABLE 8 (Continued)

(c) x/L = 0.806

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.732	-0.026	-0.021	0.059	0.032	0.041	0.0578	-0.0021	0.093	-0.003	0.0821	0.0017	0.0105	0.0048
0.0117	0.743	-0.028	-0.016	0.060	0.033	0.041	0.0695	-0.0071	0.109	-0.011	0.1053	0.0071	0.0395	0.0183
0.0168	0.793	-0.031	-0.013	0.057	0.033	0.041	0.0584	-0.0066	0.097	-0.011	0.1519	0.0054	0.0316	0.0147
0.0210	0.812	-0.033	-0.012	0.055	0.032	0.041	0.0521	-0.0076	0.091	-0.013	0.1897	0.0073	0.0467	0.0217
0.0271	0.838	-0.036	-0.012	0.052	0.031	0.039	0.0440	-0.0027	0.085	-0.005	0.2450	0.0072	0.0507	0.0232
0.0323	0.855	-0.036	-0.012	0.051	0.031	0.038	0.0486	-0.0040	0.098	-0.008	0.2916	0.0074	0.0491	0.0227
0.0378	0.882	-0.038	-0.012	0.048	0.030	0.037	0.0424	-0.0046	0.091	-0.010	0.3410	0.0074	0.0521	0.0242
0.0448	0.896	-0.038	-0.011	0.047	0.029	0.036	0.0374	-0.0047	0.088	-0.011	0.4051	0.0080	0.0604	0.0280
0.0506	0.917	-0.039	-0.012	0.042	0.028	0.034	0.0333	-0.0046	0.089	0.012	0.4574	0.0058	0.0462	0.0214
0.0609	0.952	-0.041	-0.013	0.038	0.025	0.032	0.0252	-0.0033	0.081	-0.010	0.5506	0.0059	0.0539	0.0250
0.0690	0.969	-0.043	-0.013	0.034	0.022	0.030	0.0214	-0.0012	0.083	-0.005	0.6233	0.0066	0.0655	0.0303
0.0838	0.997	-0.043	-0.013	0.027	0.018	0.023	0.0109	-0.0008	0.070	-0.005	0.7572	0.0040	0.0551	0.0255
0.0973	1.018	-0.041	-0.013	0.017	0.012	0.016	0.0014	-0.0012	0.020	-0.017	0.8794	0.0008	0.0323	0.0150
0.1154	1.026	-0.039	-0.012	0.008	0.007	0.002								
0.1415	1.027	-0.035	-0.012	0.004	0.003	0.001								
0.1856	1.027	-0.030	-0.012	0.003	0.002	0.001								
0.2220	1.026	-0.026	-0.011	0.003	0.002	0.001								

$\delta_p^* = 0.01571$ $\quad \delta_r = 0.11069$ $\quad \frac{U_\delta}{U_o} = 1.02600$

$a = 0.53300$ $\quad \delta_a = 0.12389$ $\quad b = 0.26700$ $\quad \delta_b = 0.10213$

TABLE 8 (Continued)

(d) x/L = 0.858

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0108	0.667	-0.066	-0.020	0.055	0.032	0.040	0.0698	-0.0145	0.124	-0.026	0.0829	0.0011	0.0075	0.0040
0.0134	0.715	-0.071	-0.017	0.053	0.032	0.040	0.0608	-0.0170	0.113	-0.031	0.1026	0.0021	0.0149	0.0080
0.0160	0.732	-0.071	-0.016	0.052	0.032	0.040	0.0574	-0.0158	0.108	-0.030	0.1223	0.0043	0.0316	0.0170
0.0211	0.754	-0.074	-0.015	0.051	0.031	0.039	0.0528	-0.0122	0.104	-0.024	0.1617	0.0050	0.0378	0.0203
0.0266	0.782	-0.074	-0.013	0.049	0.031	0.039	0.0462	-0.0074	0.095	-0.015	0.2036	0.0047	0.0383	0.0206
0.0350	0.807	-0.075	-0.012	0.046	0.030	0.038	0.0413	-0.0123	0.092	-0.027	0.2676	0.0057	0.0493	0.0264
0.0421	0.830	-0.075	-0.011	0.045	0.030	0.038	0.0409	-0.0102	0.094	-0.024	0.3218	0.0051	0.0440	0.0236
0.0501	0.861	-0.077	-0.011	0.042	0.027	0.037	0.0338	-0.0052	0.088	-0.013	0.3834	0.0045	0.0425	0.0228
0.0656	0.898	-0.076	-0.011	0.038	0.025	0.034	0.0281	-0.0111	0.087	-0.034	0.5016	0.0053	0.0557	0.0299
0.0785	0.927	-0.074	-0.011	0.034	0.022	0.032	0.0191	-0.0073	0.071	-0.027	0.6002	0.0039	0.0499	0.0268
0.0930	0.956	-0.073	-0.011	0.029	0.019	0.028	0.0138	-0.0045	0.069	-0.023	0.7110	0.0036	0.0542	0.0291
0.1071	0.974	-0.070	-0.011	0.024	0.015	0.023	0.0073	-0.0043	0.054	-0.032	0.8194	0.0027	0.0548	0.0294
0.1281	0.996	-0.066	-0.011	0.011	0.009	0.016	0.0002	-0.0037	0.005	-0.082	0.9796	0.0001	0.0168	0.0090
0.1538	1.002	-0.061	-0.010	0.004	0.004	0.017								
0.1877	1.002	-0.055	-0.011	0.003	0.002	0.006								
0.2395	1.004	-0.047	-0.011	0.002	0.001	0.001								
0.3023	1.005	-0.040	-0.010	0.002	0.001	0.001								

$\delta^*_p = 0.02241$ $\delta_r = 0.13075$ $\frac{U_\delta}{U_o} = 1.02023$

$a = 0.44100$ $\delta_a = 0.16097$ $b = 0.22100$ $\delta_b = 0.11775$

TABLE 8 (Continued)

(e) x/L = 0.894

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\varepsilon}{U_\delta\delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.6\delta_a)(b+0.6\delta_b)-ab}}$
0.0108	0.590	0.094	-0.026	0.051	0.031	0.037	0.0654	-0.0162	0.134	-0.033	0.0630	0.0011	0.0081	0.0053
0.0134	0.615	-0.097	-0.023	0.050	0.031	0.037	0.0598	-0.0211	0.124	-0.044	0.0780	0.0026	0.0199	0.0131
0.0160	0.627	0.097	-0.020	0.050	0.030	0.036	0.0553	-0.0234	0.117	-0.050	0.0929	0.0026	0.0206	0.0135
0.0202	0.668	-0.098	-0.016	0.049	0.031	0.036	0.0493	-0.0165	0.106	-0.035	0.1173	0.0020	0.0171	0.0112
0.0289	0.692	-0.098	-0.013	0.049	0.030	0.037	0.0443	-0.0201	0.096	-0.043	0.1679	0.0042	0.0376	0.0247
0.0369	0.722	-0.098	-0.010	0.047	0.030	0.037	0.0414	-0.0199	0.092	-0.044	0.2147	0.0033	0.0309	0.0203
0.0472	0.763	-0.096	-0.009	0.045	0.029	0.037	0.0359	-0.0206	0.084	-0.048	0.2746	0.0033	0.0326	0.0214
0.0575	0.792	-0.095	-0.007	0.043	0.028	0.036	0.0327	-0.0149	0.084	-0.038	0.3345	0.0040	0.0413	0.0271
0.0707	0.821	-0.093	-0.006	0.041	0.027	0.035	0.0308	-0.0134	0.084	-0.036	0.4113	0.0046	0.0493	0.0323
0.0836	0.846	-0.091	-0.006	0.040	0.026	0.034	0.0260	-0.0147	0.076	-0.043	0.4862	0.0037	0.0437	0.0287
0.1020	0.890	-0.086	-0.005	0.035	0.023	0.031	0.0181	-0.0121	0.068	-0.045	0.5929	0.0026	0.0359	0.0236
0.1149	0.916	-0.083	-0.006	0.032	0.021	0.029	0.0158	-0.0143	0.070	-0.063	0.6679	0.0026	0.0390	0.0256
0.1332	0.947	-0.078	-0.006	0.025	0.016	0.025	0.0083	-0.0085	0.055	-0.056	0.7746	0.0018	0.0371	0.0244
0.1509	0.968	-0.074	-0.005	0.018	0.012	0.019	0.0016	-0.0068	0.020	-0.085	0.8776	0.0005	0.0254	0.0167
0.1851	0.983	-0.066	-0.006	0.005	0.005	0.018								
0.2421	0.988	-0.055	-0.007	0.003	0.002	0.011								
0.2830	0.990	-0.049	-0.008	0.003	0.002	0.002								
0.3384	0.993	-0.042	-0.008	0.002	0.001	0.001								
0.3980	0.994	-0.037	-0.007	0.003	0.001	0.001								

$\delta_p^* =$ 0.03235 $\delta_r =$ 0.17200 $\frac{U_\delta}{U_o} =$ 1.00159

$a =$ 0.35300 $\delta_a =$ 0.23037 $b =$ 0.17600 $\delta_b =$ 0.15054

TABLE 8 (Continued)

(f) x/L = 0.907

n (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{l_p^*}{\delta_r}$	$\frac{l}{\sqrt{(a+0.8d_a)(b+0.8d_b)-ab}}$
0.0108	0.557	-0.091	-0.040	0.049	0.031	0.036	0.0562	-0.0077	0.122	-0.017	0.0560	0.0010	0.0082	0.0061
0.0134	0.572	-0.092	-0.038	0.049	0.031	0.036	0.0555	-0.0105	0.121	-0.023	0.0693	0.0026	0.0208	0.0155
0.0182	0.598	-0.094	-0.033	0.047	0.032	0.036	0.0485	-0.0125	0.107	-0.028	0.0943	0.0025	0.0216	0.0161
0.0263	0.641	-0.094	-0.027	0.047	0.031	0.036	0.0461	-0.0140	0.104	-0.032	0.1359	0.0028	0.0249	0.0185
0.0366	0.675	-0.093	-0.025	0.047	0.031	0.036	0.0393	-0.0150	0.088	-0.033	0.1892	0.0030	0.0286	0.0213
0.0447	0.705	-0.092	-0.017	0.046	0.031	0.037	0.0363	-0.0126	0.082	-0.029	0.2309	0.0030	0.0294	0.0219
0.0524	0.728	-0.091	-0.016	0.045	0.031	0.037	0.0379	-0.0123	0.087	-0.028	0.2708	0.0034	0.0332	0.0247
0.0656	0.770	-0.087	-0.014	0.043	0.030	0.037	0.0358	-0.0128	0.086	-0.031	0.3391	0.0039	0.0387	0.0288
0.0756	0.790	-0.086	-0.012	0.043	0.028	0.036	0.0314	-0.0116	0.079	-0.029	0.3907	0.0036	0.0389	0.0289
0.0878	0.824	-0.082	-0.011	0.042	0.028	0.036	0.0313	-0.0140	0.083	-0.037	0.4540	0.0034	0.0360	0.0268
0.1017	0.856	-0.077	-0.010	0.039	0.026	0.033	0.0232	-0.0152	0.071	-0.047	0.5256	0.0029	0.0366	0.0272
0.1200	0.891	-0.073	-0.010	0.036	0.024	0.031	0.0207	-0.0103	0.074	-0.037	0.6205	0.0030	0.0398	0.0296
0.1381	0.924	-0.068	-0.009	0.031	0.021	0.027	0.0142	-0.0095	0.066	-0.044	0.7138	0.0023	0.0364	0.0271
0.1564	0.952	-0.063	-0.009	0.027	0.017	0.022	0.0100	-0.0075	0.067	-0.050	0.8087	0.0019	0.0356	0.0265
0.1719	0.974	-0.059	-0.009	0.019	0.013	0.018	0.0029	-0.0055	0.034	-0.065	0.8886	0.0007	0.0248	0.0185
0.2005	0.991	-0.051	-0.009	0.007	0.007	0.004								
0.2424	0.996	-0.041	-0.009	0.003	0.002	0.001								
0.3278	1.002	-0.026	-0.008	0.003	0.001	0.001								
0.4289	1.006	-0.015	-0.006	0.002	0.001	0.001								
0.5516	1.010	-0.003	-0.006	0.003	0.001	0.001								
0.6686	1.012	0.003	-0.006	0.002	0.001	0.000								
0.7204	1.014	0.004	-0.007	0.002	0.001	0.000								

$\delta_p^* = 0.03700$ $\delta_r = 0.19343$ $\frac{U_\delta}{U_o} = 0.99114$

$a = 0.32200$ $d_a = 0.27262$ $b = 0.16100,$ $d_b = 0.14154$

TABLE 8 (Continued)

(g) x/L = 0.914

n_w (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{l_p^*}{\delta_r}$	$\frac{l}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0205	0.589	-0.112	-0.033	0.046	0.031	0.036	0.0498	-0.0120	0.112	-0.027	0.1028	0.0011	0.0102	0.0080
0.0257	0.622	-0.112	-0.030	0.045	0.031	0.036	0.0433	-0.0104	0.101	-0.024	0.1286	0.0021	0.0214	0.0169
0.0308	0.639	-0.111	-0.027	0.046	0.030	0.036	0.0406	-0.0102	0.094	-0.024	0.1545	0.0030	0.0317	0.0250
0.0437	0.678	-0.109	-0.022	0.044	0.031	0.037	0.0381	-0.0136	0.090	-0.032	0.2191	0.0030	0.0322	0.0254
0.0546	0.711	-0.106	-0.018	0.043	0.030	0.037	0.0349	-0.0169	0.085	-0.041	0.2740	0.0030	0.0337	0.0266
0.0624	0.732	-0.105	-0.017	0.043	0.029	0.037	0.0331	-0.0199	0.082	-0.050	0.3127	0.0031	0.0357	0.0282
0.0753	0.763	-0.103	-0.015	0.042	0.029	0.036	0.0313	-0.0186	0.080	-0.047	0.3773	0.0030	0.0357	0.0282
0.0885	0.796	-0.099	-0.013	0.041	0.028	0.035	0.0268	-0.0147	0.073	-0.040	0.4436	0.0026	0.0335	0.0264
0.1039	0.833	-0.096	-0.013	0.038	0.027	0.034	0.0278	-0.0112	0.085	-0.034	0.5211	0.0031	0.0387	0.0305
0.1168	0.859	-0.093	-0.012	0.036	0.025	0.032	0.0216	-0.0123	0.073	-0.042	0.5857	0.0027	0.0394	0.0311
0.1352	0.890	-0.088	-0.011	0.032	0.022	0.030	0.0162	-0.0128	0.067	-0.053	0.6777	0.0023	0.0389	0.0307
0.1532	0.918	-0.085	-0.011	0.028	0.019	0.026	0.0112	-0.0083	0.061	-0.045	0.7682	0.0018	0.0357	0.0281
0.1690	0.941	-0.080	-0.011	0.023	0.015	0.021	0.0077	-0.0068	0.063	-0.055	0.8473	0.0014	0.0346	0.0273
0.1870	0.961	-0.076	-0.011	0.014	0.011	0.016	0.0021	-0.0050	0.037	-0.089	0.9378	0.0006	0.0288	0.0227
0.2080	0.970	-0.070	-0.011	0.007	0.006	0.005								
0.2495	0.976	-0.061	-0.011	0.003	0.002	0.001								
0.3506	0.982	-0.044	-0.010	0.003	0.001	0.001								
0.4679	0.989	-0.032	-0.008	0.002	0.001	0.001								
0.5951	0.994	-0.022	-0.008	0.002	0.001	0.001								
0.7339	0.996	-0.014	-0.009	0.003	0.001	0.000								

$\delta_p^* =$ 0.04288 $\delta_r =$ 0.19943 $\frac{U_\delta}{U_o} =$ 0.98150

$a =$ 0.30000 $\delta_a =$ 0.27348 $b =$ 0.15000 $\delta_b =$ 0.14132

TABLE 8 (Continued)

(h) x/L = 0.934

$\frac{n_c}{(ft)}$	$\frac{u_s}{U_e}$	$\frac{v_n}{U_e}$	$\frac{v_\theta}{U_e}$	$\frac{\sqrt{\overline{u_s'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_e}$	$100\frac{-\overline{u_s'v_n'}}{U_0^2}$	$100\frac{-\overline{u_s'v_\theta'}}{U_0^2}$	$\frac{-\overline{u_s'v_n'}}{q^2}$	$\frac{-\overline{u_s'v_\theta'}}{q^2}$	$\frac{n_c}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.422	-0.114	-0.037	0.050	0.034	0.034	0.1069	-0.0042	0.220	-0.009	0.0385	0.0013	0.0087	0.0081
0.0117	0.441	-0.118	-0.034	0.049	0.033	0.033	0.0966	-0.0081	0.209	-0.017	0.0494	0.0026	0.0180	0.0168
0.0168	0.477	-0.124	-0.028	0.050	0.034	0.034	0.1013	-0.0116	0.209	-0.024	0.0711	0.0024	0.0161	0.0151
0.0220	0.526	-0.131	-0.023	0.050	0.034	0.035	0.0949	-0.0119	0.192	-0.024	0.0929	0.0026	0.0176	0.0165
0.0323	0.559	-0.134	-0.015	0.051	0.034	0.036	0.0982	-0.0136	0.196	-0.027	0.1364	0.0053	0.0361	0.0337
0.0429	0.603	-0.136	-0.008	0.051	0.034	0.037	0.0914	-0.0191	0.178	-0.037	0.1813	0.0048	0.0340	0.0317
0.0532	0.638	-0.136	-0.005	0.050	0.034	0.036	0.0825	-0.0150	0.167	-0.030	0.2248	0.0053	0.0370	0.0364
0.0687	0.681	-0.136	-0.001	0.050	0.033	0.037	0.0812	-0.0088	0.164	-0.018	0.2901	0.0062	0.0459	0.0428
0.0842	0.719	-0.135	0.004	0.048	0.033	0.036	0.0766	-0.0065	0.165	-0.014	0.3554	0.0057	0.0438	0.0409
0.1006	0.766	-0.132	0.006	0.046	0.032	0.035	0.0713	-0.0103	0.164	-0.024	0.4247	0.0055	0.0439	0.0410
0.1260	0.819	-0.129	0.009	0.042	0.029	0.033	0.0592	-0.0095	0.160	-0.026	0.5322	0.0063	[illegible]	0.0513
0.1496	0.859	-0.126	0.010	0.037	0.026	0.030	0.0453	-0.0078	0.153	-0.027	0.6314	0.0055	[illegible]	0.0707
0.1731	0.897	-0.123	0.011	0.033	0.022	0.026	0.0323	-0.0076	0.145	-0.034	0.7307	0.0043	0.0503	[illegible]
0.2040	0.939	-0.118	0.013	0.023	0.015	0.017	0.0120	-0.0051	0.114	-0.049	0.8613	0.0024	0.0458	[illegible]
0.2378	0.960	-0.112	0.014	0.010	0.008	0.007								
0.2819	0.965	-0.103	0.014	0.003	0.002	0.002								
0.3418	0.969	-0.093	0.015	0.003	0.001	0.001								
0.4433	0.973	-0.081	0.016	0.003	0.001	0.001								
0.5448	0.976	-0.072	0.018	0.003	0.001	0.001								
0.6488	0.980	-0.067	0.019	0.003	0.001	0.001								
0.7319	0.984	-0.066	0.019	0.002	0.001	0.001								

$\delta_p^* = 0.05181$ $\delta_r = 0.23684$ $\frac{U_\delta}{U_0} = 0.96980$

$a = 0.23600$ $\delta_a = 0.32512$ $b = 0.11800$ $\delta_b = 0.15997$

TABLE 8 (Continued)

(i) x/L = 0.944

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.64\delta_a)(b+0.64\delta_b)}-ab}$
0.0078	0.375	-0.086	-0.048	0.045	0.031	0.031	0.0832	0.0048	0.208	0.012	0.0301	0.0008	0.0062	0.0065
0.0104	0.396	-0.090	-0.047	0.046	0.032	0.032	0.0863	-0.0004	0.212	-0.001	0.0400	0.0019	0.0140	0.0147
0.0152	0.435	-0.096	-0.042	0.046	0.031	0.033	0.0802	-0.0124	0.189	-0.029	0.0585	0.0018	0.0141	0.0148
0.0220	0.484	-0.099	-0.038	0.047	0.032	0.034	0.0795	-0.0264	0.182	-0.060	0.0845	0.0026	0.0200	0.0210
0.0307	0.510	-0.100	-0.033	0.049	0.032	0.035	0.0850	-0.0280	0.181	-0.059	0.1179	0.0046	0.0345	0.0363
0.0484	0.574	-0.097	-0.026	0.049	0.033	0.037	0.0768	-0.0244	0.159	-0.051	0.1860	0.0040	0.0314	0.0331
0.0623	0.618	-0.096	-0.021	0.048	0.032	0.036	0.0744	-0.0235	0.159	-0.050	0.2392	0.0045	0.0358	0.0376
0.0755	0.653	-0.094	-0.019	0.048	0.032	0.036	0.0691	-0.0198	0.149	-0.043	0.2899	0.0044	0.0365	0.0384
0.0925	0.704	-0.090	-0.016	0.047	0.032	0.036	0.0704	-0.0208	0.153	-0.045	0.3555	0.0045	0.0374	0.0393
0.1067	0.740	-0.088	-0.014	0.045	0.031	0.036	0.0660	-0.0220	0.151	-0.050	0.4099	0.0051	0.0437	0.0460
0.1270	0.777	-0.085	-0.012	0.043	0.030	0.034	0.0571	-0.0203	0.146	-0.052	0.4879	0.0049	0.0445	0.0468
0.1431	0.813	-0.080	-0.011	0.041	0.029	0.033	0.0504	-0.0185	0.139	-0.051	0.5498	0.0044	0.0431	0.0453
0.1586	0.840	-0.077	-0.011	0.038	0.027	0.031	0.0402	-0.0167	0.130	-0.054	0.6092	0.0041	0.0442	0.0465
0.1744	0.868	-0.075	-0.011	0.036	0.025	0.029	0.0359	-0.0146	0.133	-0.054	0.6698	0.0040	0.0457	0.0481
0.1975	0.900	-0.070	-0.010	0.031	0.021	0.024	0.0256	-0.0108	0.130	-0.055	0.7589	0.0034	0.0464	0.0488
0.2262	0.935	-0.065	-0.010	0.022	0.015	0.017	0.0106	-0.0058	0.107	-0.059	0.8690	0.0019	0.0409	0.0430
0.2674	0.960	-0.058	-0.010	0.007	0.006	0.003								
0.3586	0.968	-0.045	-0.010	0.003	0.001	0.001								
0.4601	0.974	-0.034	-0.009	0.002	0.001	0.001								
0.5409	0.978	-0.028	-0.008	0.003	0.001	0.001								
0.6292	0.981	-0.023	-0.008	0.003	0.001	0.001								
0.7280	0.985	-0.019	-0.008	0.003	0.001	0.001								

$\delta_p^* = 0.05911$ $\delta_r = 0.26032$ $\frac{U_\delta}{U_o} = 0.96180$

$a = 0.20000$ $\delta_a = 0.33529$ $b = 0.10000$ $\delta_b = 0.17106$

TABLE 8 (Continued)

(j) x/L = 0.956

n_e (ft)	$\frac{u_x}{U_e}$	$\frac{v_n}{U_e}$	$\frac{v_\theta}{U_e}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_e}$	$100\frac{\overline{-u_x'v_n'}}{U_e^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_e^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.04\delta_a)(b+0.04\delta_b)-ab}}$
0.0091	0.320	-0.086	-0.025	0.047	0.033	0.030	0.0979	-0.0053	0.232	-0.013	0.0320	0.0013	0.0091	0.0107
0.0117	0.334	-0.089	-0.025	0.047	0.032	0.031	0.0969	-0.0121	0.228	-0.029	0.0411	0.0028	0.0193	0.0229
0.0188	0.375	-0.095	-0.023	0.048	0.033	0.032	0.0969	-0.0184	0.218	-0.041	0.0660	0.0020	0.0137	0.0162
0.0249	0.436	-0.100	-0.021	0.050	0.034	0.034	0.0973	-0.0251	0.201	-0.052	0.0875	0.0022	0.0156	0.0185
0.0320	0.461	-0.100	-0.018	0.051	0.034	0.035	0.0952	-0.0264	0.191	-0.053	0.1124	0.0040	0.0285	0.0338
0.0429	0.506	-0.100	-0.013	0.051	0.034	0.036	0.0913	-0.0328	0.181	-0.065	0.1508	0.0033	0.0240	0.0285
0.0507	0.542	-0.099	-0.009	0.052	0.035	0.036	0.0931	-0.0390	0.178	-0.075	0.1780	0.0038	0.0274	0.0325
0.0613	0.573	-0.098	-0.006	0.052	0.034	0.037	0.0842	-0.0397	0.160	-0.076	0.2153	0.0043	0.0320	0.0380
0.0739	0.617	-0.096	-0.004	0.051	0.034	0.037	0.0804	-0.0403	0.156	-0.078	0.2594	0.0045	0.0347	0.0412
0.0845	0.641	-0.095	-0.003	0.050	0.034	0.037	0.0805	-0.0405	0.158	-0.080	0.2968	0.0051	0.0393	0.0466
0.0999	0.686	-0.093	-0.001	0.048	0.035	0.037	0.0753	-0.0385	0.154	-0.079	0.3511	0.0046	0.0365	0.0433
0.1183	0.729	-0.091	-0.000	0.047	0.033	0.036	0.0719	-0.0349	0.156	-0.076	0.4156	0.0053	0.0430	0.0509
0.1518	0.794	-0.089	0.001	0.044	0.031	0.033	0.0570	-0.0274	0.141	-0.068	0.5332	0.0048	0.0439	0.0520
0.1834	0.854	-0.084	0.000	0.039	0.027	0.030	0.0438	-0.0193	0.138	-0.061	0.6441	0.0041	0.0428	0.0507
0.2143	0.901	-0.080	-0.001	0.032	0.022	0.025	0.0299	-0.0145	0.142	-0.069	0.7527	0.0035	0.0445	0.0528
0.2562	0.948	-0.075	-0.002	0.020	0.013	0.014	0.0083	-0.0055	0.107	-0.071	0.8998	0.0017	0.0400	0.0474
0.2977	0.968	-0.069	-0.004	0.005	0.005	0.001								
0.3393	0.973	-0.064	-0.005	0.003	0.002	0.001								
0.4456	0.981	-0.054	-0.006	0.003	0.001	0.001								
0.5783	0.987	-0.044	-0.006	0.003	0.001	0.001								
0.6749	0.990	-0.040	-0.007	0.003	0.001	0.001								
0.7657	0.995	-0.038	-0.007	0.003	0.001	0.001								

$\delta_p^* =$ 0.06534 $\quad \delta_r =$ 0.28469 $\quad \frac{U_\delta}{U_0} =$ 0.94760

$a =$ 0.15400 $\quad \delta_a =$ 0.37296 $\quad b =$ 0.07700 $\quad \delta_b =$ 0.17840

TABLE 9 - MEASURED MEAN AND TURBULENT VELOCITY CHARACTERISTICS FOR VARYING AXIAL LOCATIONS ALONG 84° PLANE

(a) x/L = 0.497

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.6\delta_a)(b+0.6\delta_b)-ab}}$
0.0052	0.735	-0.012	0.059	0.030	0.0242	0.056	0.0930	0.0006	0.0056	0.0014
0.0075	0.757	-0.011	0.058	0.030	0.0162	0.038	0.1333	0.0023	0.0251	0.0061
0.0097	0.776	-0.011	0.057	0.030	0.0224	0.054	0.1735	0.0036	0.0331	0.0081
0.0126	0.797	-0.011	0.057	0.029	0.0248	0.061	0.2253	0.0031	0.0271	0.0066
0.0149	0.826	-0.009	0.053	0.028	0.0222	0.061	0.2656	0.0033	0.0312	0.0076
0.0174	0.836	-0.009	0.051	0.028	0.0198	0.059	0.3116	0.0037	0.0370	0.0090
0.0207	0.870	-0.009	0.047	0.026	0.0195	0.067	0.3691	0.0027	0.0273	0.0066
0.0271	0.909	-0.008	0.041	0.024	0.0132	0.058	0.4842	0.0031	0.0380	0.0093
0.0332	0.938	-0.008	0.036	0.021	0.0103	0.059	0.5935	0.0026	0.0357	0.0087
0.0371	0.959	-0.009	0.031	0.019	0.0046	0.035	0.6625	0.0013	0.0275	0.0067
0.0429	0.976	-0.009	0.024	0.016	0.0014	0.017	0.7660	0.0007	0.0251	0.0061
0.0513	0.995	-0.010	0.013	0.011	0.0014	0.052	0.9156	0.0013	0.0475	0.0115
0.0622	0.999	-0.010	0.006	0.006						
0.0841	1.000	-0.009	0.003	0.002						
0.2046	0.998	-0.006	0.003	0.001						
0.3125	0.998	-0.006	0.003	0.001						
0.3962	0.998	-0.005	0.003	0.001						

$\delta^*_p = 0.00784$ $\delta_r = 0.05600$ $\frac{U_\delta}{U_o} = 0.99560$

$a = 0.64800$ $\delta_a = 0.10498$ $b = 0.32400$ $\delta_b = 0.07631$

TABLE 9 (Continued)

(b) x/L = 0.894

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_d\delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.483	-0.117	-0.054	0.050	0.034	0.035	0.1079	0.0175	0.222	0.036	0.0363	0.0012	0.0073	0.0060
0.0104	0.503	-0.121	-0.050	0.050	0.033	0.034	0.1040	0.0141	0.217	0.029	0.0483	0.0030	0.0189	0.0156
0.0152	0.544	-0.127	-0.048	0.049	0.034	0.034	0.0987	0.0120	0.208	0.025	0.0706	0.0034	0.0220	0.0181
0.0204	0.567	-0.131	-0.046	0.048	0.034	0.035	0.0911	0.0122	0.195	0.026	0.0945	0.0039	0.0262	0.0215
0.0275	0.613	-0.134	-0.045	0.047	0.033	0.035	0.0839	0.0131	0.187	0.029	0.1274	0.0039	0.0275	0.0227
0.0349	0.637	-0.136	-0.045	0.047	0.032	0.035	0.0836	0.0107	0.187	0.024	0.1617	0.0055	0.0389	0.0320
0.0471	0.684	-0.137	-0.043	0.045	0.031	0.034	0.0705	0.0100	0.168	0.024	0.2185	0.0045	0.0346	0.0284
0.0645	0.740	-0.135	-0.043	0.044	0.031	0.035	0.0707	0.0109	0.172	0.026	0.2991	0.0056	0.0430	0.0354
0.0819	0.784	-0.133	-0.043	0.043	0.030	0.034	0.0675	0.0066	0.170	0.017	0.3797	0.0067	0.0522	0.0429
0.1038	0.828	-0.131	-0.045	0.041	0.029	0.033	0.0573	0.0059	0.161	0.017	0.4812	0.0066	0.0562	0.0462
0.1238	0.866	-0.126	-0.047	0.038	0.027	0.031	0.0513	0.0028	0.163	0.009	0.5738	0.0064	0.0570	0.0469
0.1460	0.905	-0.122	-0.047	0.034	0.024	0.028	0.0388	0.0010	0.152	0.004	0.6768	0.0053	0.0551	0.0454
0.1718	0.945	-0.117	-0.048	0.027	0.019	0.021	0.0232	-0.0010	0.150	-0.006	0.7962	0.0040	0.0532	0.0438
0.1966	0.973	-0.112	-0.047	0.019	0.013	0.013	0.0069	-0.0010	0.102	-0.015	0.9112	0.0019	0.0476	0.0392
0.2211	0.985	-0.105	-0.046	0.008	0.006	0.001								
0.3402	0.990	-0.083	-0.043	0.002	0.001	0.001								
0.4945	0.993	-0.065	-0.039	0.002	0.001	0.001								
0.5683	0.995	-0.061	-0.039	0.002	0.001	0.001								

$\delta_p^* =$ 0.04386 $\quad\delta_r =$ 0.21574 $\quad\frac{U_d}{U_o} =$ 0.99900

$a =$ 0.35300 $\quad\delta_a =$ 0.23037 $\quad b =$ 0.17600 $\quad\delta_b =$ 0.15054

TABLE 9 (Continued)

(c) x/L = 0.914

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta\delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.450	-0.120	-0.044	0.048	0.033	0.033	0.1052	0.0074	0.232	0.016	0.0372	0.0010	0.0067	0.0065
0.0117	0.480	-0.127	-0.042	0.046	0.033	0.033	0.0943	0.0066	0.222	0.016	0.0477	0.0019	0.0127	0.0123
0.0165	0.513	-0.135	-0.039	0.045	0.033	0.033	0.0892	0.0065	0.214	0.016	0.0674	0.0028	0.0196	0.0190
0.0239	0.552	-0.141	-0.036	0.044	0.032	0.033	0.0784	0.0046	0.196	0.012	0.0976	0.0033	0.0243	0.0235
0.0336	0.591	-0.145	-0.034	0.044	0.032	0.034	0.0789	-0.0004	0.195	-0.001	0.1370	0.0037	0.0271	0.0263
0.0423	0.629	-0.147	-0.032	0.044	0.031	0.034	0.0757	-0.0024	0.187	-0.006	0.1724	0.0039	0.0292	0.0283
0.0558	0.669	-0.148	-0.031	0.044	0.031	0.034	0.0746	-0.0004	0.182	-0.001	0.2276	0.0055	0.0418	0.0405
0.0681	0.698	-0.148	-0.032	0.043	0.031	0.034	0.0670	-0.0045	0.171	-0.011	0.2775	0.0058	0.0464	0.0451
0.0806	0.725	-0.146	-0.032	0.042	0.030	0.033	0.0647	-0.0041	0.169	-0.011	0.3287	0.0060	0.0490	0.0475
0.1003	0.766	-0.143	-0.033	0.041	0.029	0.033	0.0614	-0.0069	0.168	-0.019	0.4088	0.0053	0.0438	0.0425
0.1151	0.803	-0.141	-0.035	0.041	0.028	0.032	0.0580	-0.0064	0.165	-0.018	0.4692	0.0054	0.0467	0.0453
0.1322	0.832	-0.138	-0.036	0.039	0.028	0.031	0.0516	-0.0024	0.158	-0.007	0.5388	0.0059	0.0536	0.0520
0.1521	0.867	-0.135	-0.037	0.036	0.026	0.030	0.0433	-0.0026	0.154	-0.009	0.6202	0.0055	0.0549	0.0532
0.1718	0.893	-0.133	-0.037	0.033	0.024	0.027	0.0360	-0.0021	0.153	-0.009	0.7003	0.0053	0.0575	0.0558
0.1975	0.929	-0.128	-0.039	0.028	0.020	0.021	0.0256	-0.0016	0.157	-0.010	0.8053	0.0039	0.0504	0.0489
0.2249	0.961	-0.123	-0.040	0.018	0.013	0.014	0.0076	-0.0016	0.110	-0.023	0.9169	0.0017	0.0400	0.0388
0.2558	0.978	-0.116	-0.040	0.006	0.005	0.001								
0.3296	0.981	-0.102	-0.040	0.002	0.001	0.001								
0.4562	0.984	-0.085	-0.039	0.002	0.001	0.001								
0.6143	0.989	-0.075	-0.038	0.002	0.001	0.000								

$\delta_p^* =$ 0.05161 $\quad \delta_r =$ 0.24530 $\quad \frac{U_\delta}{U_o} =$ 0.98150

$a =$ 0.30000 $\quad \delta_a =$ 0.27348 $\quad b =$ 0.15000 $\quad \delta_b =$ 0.14132

TABLE 9 (Continued)

(d) x/L = 0.944

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta\delta_p^*}$	$\frac{l_p^*}{\delta_r}$	$\frac{l}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.358	-0.110	-0.013	0.041	0.030	0.030	0.0752	-0.0088	0.215	-0.025	0.0291	0.0007	0.0055	0.0070
0.0139	0.375	-0.114	-0.010	0.043	0.030	0.030	0.0817	-0.0110	0.225	-0.030	0.0445	0.0024	0.0180	0.0228
0.0223	0.439	-0.126	-0.003	0.041	0.029	0.030	0.0670	-0.0134	0.191	-0.038	0.0713	0.0019	0.0161	0.0204
0.0288	0.460	-0.127	0.002	0.040	0.030	0.030	0.0652	-0.0185	0.189	-0.053	0.0919	0.0022	0.0190	0.0240
0.0362	0.501	-0.129	0.005	0.042	0.030	0.031	0.0657	-0.0170	0.181	-0.047	0.1155	0.0021	0.0183	0.0231
0.0426	0.524	-0.129	0.007	0.042	0.030	0.032	0.0608	-0.0205	0.166	-0.056	0.1361	0.0026	0.0233	0.0295
0.0558	0.565	-0.125	0.012	0.042	0.031	0.033	0.0627	-0.0248	0.164	-0.065	0.1783	0.0033	0.0285	0.0360
0.0629	0.583	-0.124	0.014	0.044	0.030	0.034	0.0575	-0.0249	0.147	-0.063	0.2009	0.0033	0.0299	0.0378
0.0748	0.612	-0.122	0.016	0.042	0.030	0.034	0.0559	-0.0266	0.145	-0.069	0.2390	0.0032	0.0296	0.0375
0.0890	0.651	-0.118	0.019	0.043	0.030	0.034	0.0568	-0.0258	0.143	-0.065	0.2842	0.0037	0.0341	0.0432
0.1022	0.674	-0.114	0.020	0.044	0.030	0.034	0.0580	-0.0304	0.145	-0.076	0.3264	0.0039	0.0350	0.0442
0.1173	0.715	-0.109	0.021	0.043	0.030	0.034	0.0527	-0.0314	0.138	-0.082	0.3748	0.0033	0.0317	0.0401
0.1344	0.747	-0.105	0.022	0.042	0.030	0.034	0.0530	-0.0305	0.141	-0.081	0.4293	0.0043	0.0405	0.0512
0.1566	0.785	-0.100	0.023	0.041	0.029	0.033	0.0478	-0.0296	0.133	-0.083	0.5003	0.0041	0.0412	0.0521
0.1811	0.826	-0.094	0.023	0.039	0.028	0.032	0.0410	-0.0272	0.126	-0.084	0.5784	0.0037	0.0403	0.0509
0.2033	0.860	-0.089	0.023	0.036	0.026	0.030	0.0354	-0.0240	0.123	-0.083	0.6494	0.0035	0.0407	0.0515
0.2304	0.899	-0.083	0.022	0.032	0.023	0.027	0.0258	-0.0201	0.115	-0.090	0.7358	0.0030	0.0402	0.0509
0.2629	0.935	-0.077	0.022	0.027	0.018	0.020	0.0170	-0.0121	0.119	-0.085	0.8397	0.0023	0.0392	0.0496
0.2951	0.967	-0.070	0.022	0.015	0.011	0.011	0.0041	-0.0040	0.087	-0.085	0.9426	0.0009	0.0293	0.0371
0.3309	0.980	-0.064	0.022	0.005	0.004	0.001								
0.3840	0.985	-0.057	0.021	0.002	0.001	0.001								
0.5000	0.991	-0.043	0.021	0.002	0.001	0.001								
0.7074	0.997	-0.032	0.019	0.002	0.001	0.001								

$\delta_p^* =$ 0.07101 $\delta_r =$ 0.31311 $\frac{U_\delta}{U_o} =$ 0.96180

$a =$ 0.20000 $\delta_a =$ 0.33529 $b =$ 0.10000 $\delta_b =$ 0.17106

TABLE 9 (Continued)

(e) x/L = 0.956

n_e (ft)	$\frac{u_s}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)}-ab}$
[illegible]	[illegible]	[illegible]	-0.019	0.040	0.029	0.030	0.0744	-0.0050	0.221	-0.015	0.0271	0.0007	0.0062	0.0087
0.013[illegible]	0.32[illegible]	[illegible]	-0.01[illegible]	0.040	0.029	0.030	0.0758	-0.0077	0.226	-0.023	0.0415	0.0025	0.0211	0.0296
0.0234	0.404	[illegible]	-0.011	0.040	0.029	0.031	0.0629	-0.0100	0.184	-0.029	0.0712	0.0015	0.0138	0.0193
0.0339	0.429	[illegible]	-0.00[illegible]	0.040	0.029	0.032	0.0558	-0.0089	0.161	-0.026	0.1009	0.0023	0.0232	0.0324
0.04[illegible]	0.464	0.110	-0.002	0.042	0.029	0.033	0.0610	-0.0159	0.165	-0.043	0.1296	0.0023	0.0216	0.0303
[illegible]	0.49[illegible]	-0.108	0.001	0.042	0.029	0.034	0.0539	-0.0253	0.143	-0.067	0.1593	0.0021	0.0215	0.0301
[illegible]	0.523	[illegible]	0.00[illegible]	0.044	0.030	0.034	0.0555	-0.0262	0.139	-0.066	0.1890	0.0023	0.0226	0.0316
[illegible]	[illegible]	0.102	[illegible]	0.044	0.030	0.035	0.0503	-0.0345	0.123	-0.084	0.2254	0.0023	0.0246	0.0345
[illegible]	[illegible]	-0.100	0.009	0.043	0.031	0.035	0.0487	-0.0343	0.120	-0.084	0.2618	0.0026	0.0282	0.0395
[illegible]	[illegible]	-0.095	0.011	0.044	0.031	0.035	0.0493	-0.0327	0.120	-0.080	0.3126	0.0030	0.0321	0.0450
0.124[illegible]	0.569	-0.090	0.013	0.044	0.031	0.035	0.0483	-0.0320	0.116	-0.077	0.3711	0.0031	0.0327	0.0458
0.1444	0.71[illegible]	-0.085	0.014	0.043	0.030	0.034	0.0459	-0.0340	0.117	-0.086	0.4295	0.0030	0.0326	0.0456
0.1599	0.754	[illegible]0.081	0.016	0.042	0.030	0.033	0.0414	-0.0286	0.111	-0.077	0.5023	0.0028	0.0326	0.0457
0.1914	0.79[illegible]	[illegible]0.07[illegible]	0.017	0.040	0.028	0.032	0.0368	-0.0245	0.105	-0.070	0.5694	0.0028	0.0347	0.0486
0.2180	0.832	-0.073	0.016	0.037	0.027	0.030	0.0283	-0.0239	0.093	-0.079	0.6499	0.0026	0.0364	0.0510
0.2430	0.867	-0.067	0.016	0.035	0.024	0.028	0.0265	-0.0211	0.103	-0.082	0.7227	0.0025	0.0366	0.0512
0.2703	0.900	-0.062	0.016	0.030	0.021	0.023	0.0177	-0.0139	0.095	-0.075	0.8041	0.0020	0.0350	0.0490
0.2974	0.929	0.058	0.016	0.024	0.017	0.017	0.0095	-0.0098	0.084	-0.086	0.8846	0.0012	0.0296	0.0415
0.3325	0.960	-0.051	0.016	0.011	0.008	0.009	0.0014	-0.0037	0.053	-0.141	0.9890	0.0003	0.0199	0.0279
0.3763	0.967	-0.045	0.016	0.003	0.003	0.020								
0.4997	0.974	-0.033	0.017	0.002	0.001	0.012								
0.6359	0.980	-0.026	0.017	0.002	0.001	0.003								
0.7590	0.989	-0.022	0.017	0.002	0.001	0.001								

$\delta^*_p = 0.08353$ $\delta_r = 0.33619$ $\frac{U_\delta}{U_o} = 0.94760$

$a = 0.15400$ $\delta_a = 0.37296$ $b = 0.07700$ $\delta_b = 0.17840$

TABLE 10 - MEASURED MEAN AND TURBULENT VELOCITY CHARACTERISTICS FOR VARYING AXIAL LOCATIONS ALONG 90° PLANE

(a) x/L = 0.497

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$100\,\frac{-\overline{u_x' v_n'}}{U_o^2}$	$\frac{-\overline{u_x' v_n'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\varepsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.6\delta_a)(b+0.6\delta_b)}-ab}$
0.0052	0.714	-0.014	0.060	0.030	0.0260	0.057	0.0500	0.0006	0.0030	0.0014
0.0075	0.749	-0.011	0.060	0.030	0.0297	0.067	0.0715	0.0023	0.0099	0.0045
0.0101	0.795	-0.008	0.056	0.029	0.0250	0.062	0.0960	0.0024	0.0114	0.0052
0.0149	0.818	-0.008	0.055	0.029	0.0277	0.071	0.1420	0.0066	0.0299	0.0136
0.0175	0.832	-0.008	0.054	0.029	0.0270	0.073	0.1666	0.0051	0.0234	0.0107
0.0230	0.882	-0.007	0.048	0.026	0.0250	0.083	0.2188	0.0052	0.0250	0.0114
0.0275	0.898	-0.005	0.047	0.025	0.0212	0.076	0.2617	0.0056	0.0292	0.0133
0.0339	0.939	-0.005	0.039	0.022	0.0118	0.059	0.3231	0.0027	0.0190	0.0087
0.0416	0.972	-0.006	0.031	0.018	0.0073	0.057	0.3967	0.0025	0.0218	0.0100
0.0516	1.003	-0.007	0.015	0.012	0.0000	0.000	0.4918	0.0000	0.0011	0.0005
0.1882	1.010	-0.005	0.002	0.001						
0.3122	1.012	-0.004	0.002	0.001						

$\delta_p^* = 0.00793$ $\delta_r = 0.10498$ $\frac{U_\delta}{U_o} = 1.00060$

$a = 0.64800$ $\delta_a = 0.10498$ $b = 0.32400$ $\delta_b = 0.07631$

TABLE 10 (Continued)

(b) x/L = 0.767

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.658	-0.052	0.008	0.064	0.036	0.043	0.1001	-0.0287	0.138	0.040	0.0684	0.0017	0.0071	0.0043
0.0104	0.691	-0.053	-0.003	0.065	0.035	0.042	0.1011	-0.0286	0.141	-0.040	0.0909	0.0061	0.0313	0.0149
0.0130	0.704	-0.052	-0.000	0.062	0.036	0.042	0.0913	-0.0308	0.132	0.045	0.1135	0.0084	0.0459	0.0219
0.0181	0.743	-0.052	0.001	0.060	0.035	0.040	0.0893	-0.0241	0.137	-0.037	0.1585	0.0066	0.0360	0.0172
0.0233	0.779	-0.051	0.002	0.059	0.035	0.040	0.0866	-0.0262	0.138	-0.042	0.2035	0.0079	0.0441	0.0211
0.0307	0.810	-0.050	0.004	0.054	0.034	0.039	0.0755	-0.0229	0.136	-0.041	0.2682	0.0102	0.0610	0.0291
0.0391	0.840	-0.049	0.004	0.051	0.032	0.038	0.0656	-0.0159	0.130	-0.031	0.3414	0.0070	0.0450	0.0215
0.0442	0.870	-0.047	0.005	0.049	0.030	0.036	0.0610	-0.0146	0.131	-0.031	0.3864	0.0074	0.0492	0.0235
0.0513	0.887	-0.046	0.005	0.045	0.029	0.034	0.0487	-0.0163	0.121	-0.040	0.4483	0.0096	0.0714	0.0340
0.0648	0.931	-0.042	0.008	0.041	0.026	0.029	0.0368	-0.0156	0.115	-0.049	0.5665	0.0070	0.0594	0.0283
0.0758	0.958	-0.040	0.009	0.034	0.022	0.023	0.0269	-0.0142	0.122	-0.064	0.6621	0.0065	0.0645	0.0308
0.0935	0.991	-0.037	0.013	0.023	0.016	0.015	0.0117	-0.0089	0.114	-0.087	0.8169	0.0045	0.0689	0.0328
0.1173	1.009	-0.032	0.017	0.008	0.007	0.001								
0.1666	1.009	-0.024	0.018	0.003	0.002	0.001								
0.2604	1.007	-0.016	0.021	0.002	0.001	0.001								
0.3670	1.007	-0.009	0.010	0.002	0.001	0.000								

$\delta_p^* = 0.01840$ $\delta_r = 0.11447$ $\frac{U_\delta}{U_o} = 1.02058$

$a = 0.58000$ $\delta_a = 0.11447$ $b = 0.29000$ $\delta_b = 0.09683$

TABLE 10 (Continued)

(c) x/L = 0.806

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta\delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0091	0.624	-0.060	-0.016	0.087	0.055	0.040	0.1936	-0.0262	0.159	-0.022	0.0733	0.0028	0.0086	0.0045
0.0117	0.710	-0.062	-0.014	0.076	0.044	0.039	0.1273	-0.0231	0.138	-0.025	0.0941	0.0027	0.0103	0.0053
0.0142	0.768	-0.062	-0.011	0.060	0.035	0.039	0.0670	-0.0200	0.105	-0.031	0.1149	0.0024	0.0127	0.0066
0.0194	0.790	-0.060	-0.009	0.054	0.032	0.039	0.0577	-0.0175	0.105	-0.032	0.1565	0.0060	0.0333	0.0173
0.0242	0.825	-0.061	-0.009	0.052	0.032	0.038	0.0537	-0.0181	0.104	-0.035	0.1955	0.0051	0.0298	0.0154
0.0300	0.855	-0.062	-0.008	0.050	0.031	0.038	0.0559	-0.0173	0.115	-0.036	0.2423	0.0075	0.0427	0.0221
0.0352	0.875	-0.062	0.008	0.047	0.030	0.038	0.0475	-0.0151	0.106	-0.034	0.2839	0.0087	0.0533	0.0277
0.0429	0.894	-0.061	-0.007	0.044	0.029	0.037	0.0422	-0.0120	0.101	-0.029	0.3463	0.0087	0.0570	0.0296
0.0506	0.920	-0.059	-0.007	0.043	0.027	0.036	0.0390	-0.0135	0.102	-0.035	0.4087	0.0072	0.0491	0.0255
0.0587	0.945	-0.056	-0.007	0.039	0.025	0.034	0.0319	-0.0153	0.095	-0.046	0.4737	0.0075	0.0563	0.0292
0.0664	0.961	-0.057	-0.008	0.037	0.024	0.033	0.0264	-0.0172	0.087	-0.057	0.5361	0.0077	0.0639	0.0331
0.0870	1.006	-0.053	-0.006	0.029	0.018	0.025	0.0137	-0.0101	0.076	-0.056	0.7025	0.0047	0.0537	0.0279
0.1337	1.044	-0.041	-0.000	0.005	0.005	0.001								
0.2017	1.044	-0.030	0.003	0.003	0.002	0.000								
0.2687	1.044	-0.024	0.004	0.003	0.001	0.000								

$\delta_p^* =$ 0.01621 $\delta_r =$ 0.12389 $\frac{U_\delta}{U_o} =$ 1.02589

$a =$ 0.53300 $\delta_a =$ 0.12389 $b =$ 0.26700 $\delta_b =$ 0.10213

TABLE 10 (Continued)

(d) x/L = 0.858

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)}-ab}$
0.0108	0.628	-0.077	0.007	0.049	0.030	0.036	0.0576	-0.0208	0.125	-0.045	0.0673	0.0008	0.0068	0.0045
0.0157	0.657	-0.081	-0.005	0.049	0.030	0.036	0.0560	-0.0148	0.121	-0.032	0.0973	0.0030	0.0246	0.0163
0.0211	0.690	-0.084	-0.003	0.049	0.030	0.036	0.0521	-0.0182	0.115	0.040	0.1313	0.0036	0.0313	0.0207
0.0289	0.708	-0.086	-0.003	0.046	0.030	0.035	0.0472	-0.0150	0.110	-0.035	0.1794	0.0037	0.0336	0.0222
0.0366	0.752	-0.086	-0.003	0.045	0.029	0.036	0.0445	-0.0109	0.108	-0.026	0.2274	0.0030	0.0280	0.0185
0.0459	0.785	-0.086	-0.003	0.042	0.027	0.036	0.0373	-0.0114	0.098	-0.030	0.2854	0.0038	0.0387	0.0256
0.0530	0.805	-0.085	-0.003	0.041	0.027	0.035	0.0347	-0.0120	0.097	-0.033	0.3294	0.0043	0.0453	0.0300
0.0627	0.827	-0.083	-0.003	0.040	0.025	0.035	0.0305	-0.0111	0.089	-0.033	0.3895	0.0043	0.0487	0.0322
0.0782	0.859	-0.081	-0.003	0.037	0.024	0.034	0.0278	-0.0115	0.091	-0.038	0.4855	0.0042	0.0489	0.0323
0.0888	0.882	-0.078	-0.004	0.034	0.023	0.033	0.0258	-0.0102	0.092	-0.036	0.5515	0.0039	0.0476	0.0315
0.1013	0.908	-0.075	-0.004	0.032	0.021	0.031	0.0211	-0.0090	0.088	-0.037	0.6296	0.0034	0.0460	0.0304
0.1174	0.937	-0.072	-0.004	0.027	0.018	0.026	0.0134	-0.0075	0.076	0.043	0.7296	0.0026	0.0444	0.0293
0.1355	0.962	-0.067	-0.003	0.022	0.014	0.021	0.0066	-0.0064	0.061	-0.059	0.8417	0.0018	0.0437	0.0289
0.1538	0.979	-0.062	-0.001	0.012	0.008	0.015	0.0010	-0.0051	0.023	-0.122	0.9557	0.0005	0.0266	0.0189
0.1877	0.987	-0.054	0.002	0.004	0.003	0.001								
0.2395	0.988	-0.044	0.003	0.003	0.002	0.001								
0.3043	0.989	-0.037	0.004	0.003	0.001	0.001								
0.3668	0.990	-0.032	0.004	0.003	0.001	0.000								

$\delta_p^* =$ 0.03108 $\delta_r =$ 0.16097 $\frac{U_\delta}{U_o} =$ 1.01843

$a =$ 0.44100 $\delta_a =$ 0.16097 $b =$ 0.22100 $\delta_b =$ 0.11775

TABLE 10 (Continued)

(e) x/L = 0.894

n_e (ft)	$\frac{u_x}{U_e}$	$\frac{v_n}{U_e}$	$\frac{v_\theta}{U_e}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_e}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_e}$	$100\frac{\overline{-u_x'v_n'}}{U_e^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_e^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_d\delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.526	-0.080	-0.010	0.046	0.030	0.033	0.0541	-0.0196	0.133	-0.048	0.0340	0.0004	0.0028	0.0025
0.0146	0.581	-0.085	-0.002	0.043	0.028	0.031	0.0461	-0.0144	0.130	-0.040	0.0634	0.0017	0.0148	0.0130
0.0201	0.607	-0.086	-0.002	0.042	0.028	0.031	0.0447	-0.0092	0.127	-0.026	0.0871	0.0023	0.0206	0.0181
0.0288	0.641	-0.087	-0.001	0.040	0.027	0.032	0.0372	-0.0101	0.110	-0.030	0.1239	0.0022	0.0216	0.0190
0.0391	0.681	-0.083	-0.001	0.038	0.027	0.032	0.0299	-0.0068	0.093	-0.021	0.1696	0.0021	0.0229	0.0201
0.0494	0.708	-0.081	-0.002	0.039	0.026	0.032	0.0317	-0.0068	0.098	-0.021	0.2144	0.0029	0.0307	0.0270
0.0677	0.750	-0.074	-0.004	0.038	0.026	0.033	0.0328	-0.0075	0.103	-0.024	0.2941	0.0034	0.0349	0.0307
0.0835	0.785	-0.067	-0.005	0.037	0.026	0.033	0.0297	-0.0073	0.097	-0.024	0.3626	0.0035	0.0374	0.0328
0.0964	0.809	-0.063	-0.006	0.037	0.025	0.032	0.0284	-0.0092	0.094	-0.030	0.4185	0.0039	0.0435	0.0382
0.1144	0.836	-0.057	-0.008	0.036	0.025	0.032	0.0289	-0.0082	0.098	-0.028	0.4968	0.0040	0.0444	0.0390
0.1373	0.879	-0.049	-0.008	0.034	0.024	0.030	0.0261	-0.0086	0.101	-0.033	0.5961	0.0036	0.0420	0.0369
0.1612	0.913	-0.043	-0.008	0.030	0.021	0.026	0.0197	-0.0061	0.099	-0.031	0.6995	0.0032	0.0431	0.0379
0.1795	0.939	-0.039	-0.007	0.027	0.019	0.022	0.0167	-0.0043	0.107	-0.027	0.7792	0.0029	0.0419	0.0368
0.2079	0.974	-0.032	-0.006	0.019	0.012	0.014	0.0060	-0.0030	0.084	-0.041	0.9023	0.0015	0.0371	0.0326
0.2391	0.991	-0.024	-0.004	0.006	0.006	0.001								
0.2939	0.996	-0.013	-0.002	0.003	0.002	0.001								
0.4163	1.002	0.001	-0.001	0.003	0.001	0.001								
0.5097	1.004	0.010	-0.002	0.003	0.001	0.001								
0.6034	1.006	0.016	0.022	0.003	0.001	0.001								

$\delta_p^* =$ 0.04315 $\delta_r =$ 0.23037 $\frac{U_d}{U_e} =$ 0.99488

$a =$ 0.35300 $\delta_a =$ 0.23037 $b =$ 0.17600 $\delta_b =$ 0.15054

TABLE 10 (Continued)

(f) x/L = 0.907

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.4[illegible]	[illegible].092	0.010	0.043	0.029	0.033	0.0583	-0.0051	0.155	-0.013	0.0287	0.0004	0.0031	0.0033
0.0130	0.510	0.098	0.014	0.041	0.027	0.032	0.0481	0.0008	0.140	0.002	0.0476	0.0012	0.0113	0.0118
0.0191	0.535	-0.100	0.017	0.038	0.027	0.032	0.0407	0.0013	0.128	0.004	0.0701	0.0013	0.0132	0.0139
0.0281	0.583	-0.100	0.017	0.038	0.026	0.031	0.0371	0.0021	0.120	0.007	0.1032	0.0021	0.0218	0.0229
0.0359	0.609	-0.100	0.016	0.036	0.025	0.031	0.0314	0.0014	0.108	0.005	0.1315	0.0019	0.0218	0.0229
0.0468	0.636	-0.097	0.014	0.036	0.025	0.032	0.0308	0.0037	0.105	0.013	0.1717	0.0024	0.0269	0.0282
0.0619	0.671	-0.091	0.011	0.036	0.025	0.032	0.0314	0.0034	0.104	0.011	0.2272	0.0022	0.0252	0.0265
0.0729	0.701	-0.086	0.009	0.036	0.024	0.033	0.0280	0.0072	0.095	0.024	0.2674	0.0022	0.0259	0.0271
0.0861	0.726	-0.081	0.008	0.035	0.025	0.033	0.0295	0.0086	0.101	0.029	0.3158	0.0028	0.0327	0.0343
0.1096	0.772	-0.071	0.006	0.035	0.024	0.033	0.0288	0.0040	0.098	0.014	0.4021	0.0030	0.0354	0.0372
0.1325	0.808	-0.065	0.003	0.034	0.024	0.032	0.0291	0.0020	0.104	0.007	0.4860	0.0033	0.0390	0.0409
0.1560	0.847	-0.058	0.001	0.033	0.023	0.031	0.0255	0.0027	0.101	0.011	0.5722	0.0029	0.0365	0.0383
0.1795	0.883	-0.050	0.001	0.030	0.021	0.027	0.0227	0.0023	0.109	0.011	0.6585	0.0030	0.0396	0.0415
0.2030	0.912	-0.044	0.001	0.026	0.018	0.022	0.0168	0.0011	0.110	0.007	0.7447	0.0027	0.0413	0.0433
0.2443	0.953	-0.036	0.003	0.015	0.011	0.012	0.0044	-0.0007	0.090	-0.014	0.8959	0.0012	0.0349	0.0366
0.3093	0.969	-0.022	0.005	0.003	0.002	0.003								
0.4082	0.974	-0.010	0.007	0.003	0.001	0.001								
0.5177	0.979	0.001	0.007	0.003	0.001	0.001								
0.6401	0.983	0.009	0.006	0.003	0.001	0.001								

$\delta_p^* = 0.05550$ $\delta_r = 0.27262$ $\frac{U_\delta}{U_o} = 0.98241$

$a = 0.32200$ $\delta_a = 0.27262$ $b = 0.16100$ $\delta_b = 0.14154$

TABLE 10 (Continued)

(g) x/L = 0.914

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.64\delta_a)(b+0.64\delta_b)-ab}}$
0.0091	0.461	0.092	0.021	0.042	0.028	0.032	0.0552	-0.0057	0.155	-0.016	0.0333	0.0004	0.0037	0.0040
0.0146	0.500	-0.099	0.025	0.041	0.027	0.031	0.0489	-0.0084	0.146	-0.025	0.0534	0.0009	0.0091	0.0098
0.0194	0.551	0.103	0.026	0.037	0.027	0.031	0.0374	-0.0005	0.123	-0.002	0.0710	0.0009	0.0102	0.0110
0.0268	0.561	-0.103	0.026	0.037	0.026	0.030	0.0362	-0.0001	0.121	-0.000	0.0981	0.0028	0.0318	0.0343
0.0375	0.597	0.102	0.024	0.035	0.025	0.031	0.0296	-0.0053	0.103	-0.018	0.1370	0.0017	0.0206	0.0222
0.0474	0.624	-0.099	0.022	0.035	0.025	0.032	0.0299	-0.0015	0.105	-0.005	0.1735	0.0021	0.0262	0.0284
0.0558	0.642	-0.096	0.020	0.035	0.025	0.032	0.0282	0.0012	0.097	0.004	0.2041	0.0023	0.0286	0.0310
0.0687	0.670	-0.092	0.017	0.035	0.025	0.032	0.0283	0.0018	0.099	0.006	0.2512	0.0022	0.0282	0.0305
0.0896	0.717	0.083	0.014	0.035	0.025	0.033	0.0280	0.0053	0.097	0.018	0.3278	0.0026	0.0325	0.0352
0.1025	0.738	0.077	0.011	0.035	0.025	0.033	0.0306	0.0062	0.104	0.021	0.3749	0.0030	0.0370	0.0400
0.1209	0.772	-0.071	0.009	0.034	0.024	0.033	0.0276	0.0049	0.097	0.017	0.4420	0.0028	0.0353	0.0382
0.1363	0.797	0.066	0.007	0.034	0.024	0.032	0.0268	0.0033	0.095	0.012	0.4986	0.0028	0.0363	0.0393
0.1547	0.828	0.060	0.005	0.033	0.024	0.031	0.0291	0.0042	0.109	0.016	0.5657	0.0033	0.0407	0.0440
0.1755	0.856	0.055	0.003	0.032	0.022	0.030	0.0274	0.0035	0.114	0.015	0.6411	0.0033	0.0425	0.0459
0.1963	0.887	-0.048	0.002	0.029	0.021	0.027	0.0218	0.0019	0.109	0.010	0.7176	0.0028	0.0397	0.0429
0.2272	0.923	-0.042	0.001	0.024	0.016	0.021	0.0131	0.0001	0.102	0.001	0.8307	0.0022	0.0400	0.0433
0.2639	0.956	-0.034	0.003	0.012	0.009	0.009	0.0024	-0.0008	0.078	-0.025	0.9650	0.0007	0.0307	0.0332
0.3000	0.966	-0.026	0.004	0.004	0.003	0.001								
0.3803	0.972	-0.014	0.004	0.003	0.002	0.001								
0.4900	0.976	-0.004	0.004	0.003	0.001	0.000								
0.5889	0.979	0.004	0.003	0.003	0.001	0.000								
0.6617	0.980	0.008	0.002	0.003	0.001	0.000								

δ_p^* 0.05938 δ_r = 0.27348 $\frac{U_\delta}{U_o}$ = 0.97870

a = 0.30000 δ_a = 0.27348 b = 0.15000 δ_b = 0.14132

TABLE 10 (Continued)

(h) x/L = 0.934

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{\overline{-u_x'v_n'}}{U_o^2}$	$100\frac{\overline{-u_x'v_\theta'}}{U_o^2}$	$\frac{\overline{-u_x'v_n'}}{q^2}$	$\frac{\overline{-u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0108	0.420	-0.106	-0.002	0.039	0.026	0.028	0.0483	0.0060	0.161	0.020	0.0333	0.0004	0.0041	0.0053
0.0160	0.450	-0.109	-0.001	0.037	0.026	0.028	0.0425	0.0031	0.148	0.011	0.0492	0.0010	0.0110	0.0141
0.0250	0.502	-0.113	-0.001	0.036	0.025	0.028	0.0340	0.0032	0.128	0.012	0.0769	0.0012	0.0147	0.0188
0.0318	0.519	-0.113	-0.001	0.034	0.024	0.028	0.0308	0.0048	0.121	0.019	0.0977	0.0016	0.0215	0.0275
0.0443	0.553	-0.111	-0.002	0.033	0.024	0.028	0.0273	0.0037	0.111	0.015	0.1364	0.0014	0.0204	0.0261
0.0524	0.572	-0.109	-0.003	0.033	0.023	0.029	0.0268	0.0042	0.107	0.017	0.1611	0.0016	0.0222	0.0284
0.0633	0.596	-0.103	-0.004	0.033	0.024	0.030	0.0256	0.0050	0.102	0.020	0.1948	0.0017	0.0253	0.0325
0.0785	0.620	-0.098	-0.006	0.033	0.023	0.031	0.0262	0.0063	0.101	0.024	0.2414	0.0019	0.0281	0.0360
0.0939	0.650	-0.090	-0.008	0.034	0.023	0.031	0.0251	0.0074	0.096	0.028	0.2889	0.0017	0.0252	0.0323
0.1097	0.681	-0.083	-0.010	0.033	0.024	0.031	0.0246	0.0087	0.095	0.034	0.3375	0.0019	0.0281	0.0360
0.1278	0.708	-0.077	-0.012	0.033	0.024	0.033	0.0260	0.0107	0.095	0.039	0.3929	0.0022	0.0319	0.0409
0.1506	0.745	-0.067	-0.014	0.034	0.024	0.032	0.0292	0.0093	0.105	0.033	0.4633	0.0024	0.0331	0.0424
0.1748	0.782	-0.060	-0.015	0.033	0.024	0.032	0.0277	0.0096	0.104	0.036	0.5376	0.0024	0.0337	0.0432
0.2028	0.823	-0.051	-0.015	0.031	0.023	0.031	0.0254	0.0117	0.103	0.047	0.6238	0.0024	0.0351	0.0450
0.2369	0.868	-0.043	-0.016	0.029	0.021	0.027	0.0234	0.0057	0.115	0.028	0.7288	0.0025	0.0374	0.0480
0.2656	0.903	-0.037	-0.016	0.026	0.018	0.021	0.0173	0.0029	0.121	0.020	0.8170	0.0020	0.0355	0.0455
0.2962	0.935	-0.031	-0.013	0.019	0.013	0.013	0.0071	0.0005	0.100	0.007	0.9111	0.0011	0.0305	0.0390
0.3307	0.956	-0.025	-0.010	0.008	0.006	0.001								
0.3771	0.962	-0.017	-0.007	0.003	0.002	0.001								
0.4840	0.969	-0.007	-0.004	0.003	0.001	0.001								
0.6193	0.975	0.002	-0.002	0.003	0.001	0.000								
0.6811	0.977	0.006	-0.002	0.003	0.001	0.000								
0.7314	0.979	0.008	-0.002	0.003	0.001	0.000								

$\delta_p^* = 0.07835$ $\delta_r = 0.32512$ $\frac{U_\delta}{U_o} = 0.96950$

$a = 0.23600$ $\delta_a = 0.32512$ $b = 0.11800$ $\delta_b = 0.15997$

TABLE 10 (Continued)

(i) x/L = 0.944

n_o (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_o}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0108	0.391	-0.104	0.022	0.040	0.027	0.027	0.0478	-0.0022	0.156	-0.007	0.0323	0.0003	0.0032	0.0043
0.0215	0.446	-0.109	0.035	0.037	0.026	0.027	0.0401	0.0004	0.145	0.001	0.0640	0.0010	0.0122	0.0165
0.0292	0.483	-0.112	0.025	0.035	0.024	0.027	0.0331	-0.0030	0.128	-0.012	0.0871	0.0010	0.0130	0.0175
0.0369	0.511	-0.111	0.025	0.034	0.024	0.028	0.0310	-0.0012	0.122	-0.005	0.1101	0.0012	0.0161	0.0218
0.0469	0.538	-0.109	0.023	0.033	0.023	0.028	0.0249	0.0008	0.104	0.003	0.1399	0.0013	0.0191	0.0259
0.0604	0.567	-0.104	0.022	0.033	0.024	0.029	0.0264	-0.0003	0.107	-0.001	0.1803	0.0015	0.0220	0.0298
0.0724	0.594	-0.100	0.020	0.032	0.024	0.030	0.0255	0.0006	0.103	0.003	0.2158	0.0016	0.0233	0.0315
0.0910	0.626	-0.093	0.016	0.033	0.023	0.031	0.0258	0.0020	0.101	0.008	0.2715	0.0018	0.0258	0.0350
0.1110	0.666	-0.083	0.012	0.033	0.024	0.031	0.0266	0.0019	0.102	0.007	0.3311	0.0021	0.0298	0.0403
0.1278	0.688	-0.077	0.010	0.033	0.024	0.031	0.0276	0.0027	0.104	0.010	0.3810	0.0024	0.0335	0.0454
0.1538	0.733	-0.067	0.006	0.034	0.024	0.032	0.0276	0.0037	0.100	0.013	0.4588	0.0021	0.0294	0.0398
0.1822	0.780	0.057	0.002	0.033	0.024	0.032	0.0273	0.0050	0.101	0.019	0.5434	0.0022	0.0313	0.0423
0.2121	0.825	-0.049	0.001	0.032	0.023	0.032	0.0256	0.0085	0.100	0.033	0.6327	0.0023	0.0344	0.0465
0.2424	0.864	-0.042	-0.001	0.029	0.021	0.028	0.0216	0.0059	0.103	0.028	0.7230	0.0022	0.0354	0.0480
0.2737	0.901	-0.037	-0.002	0.026	0.018	0.025	0.0162	0.0058	0.100	0.036	0.8162	0.0018	0.0339	0.0459
0.3101	0.939	-0.031	-0.001	0.018	0.012	0.017	0.0061	0.0009	0.084	0.012	0.9248	0.0010	0.0314	0.0425
0.3410	0.954	-0.026	0.000	0.008	0.006	0.007								
0.4086	0.963	-0.016	0.003	0.003	0.002	0.001								
0.5152	0.970	-0.008	0.005	0.003	0.001	0.001								
0.6270	0.973	0.000	0.004	0.003	0.001	0.001								
0.7339	0.977	0.005	0.003	0.003	0.001	0.001								
0.7626	0.978	0.006	-0.009	0.003	0.001	0.001								

$\delta_p^* =$ 0.08220 $\delta_r =$ 0.33529 $\frac{U_\delta}{U_o} =$ 0.96310

$a =$ 0.20000 $\delta_a =$ 0.33529 $b =$ 0.10000 $\delta_b =$ 0.17106

TABLE 10 (Continued)

(j) x/L = 0.956

n_e (ft)	$\frac{u_x}{U_o}$	$\frac{v_n}{U_o}$	$\frac{v_\theta}{U_o}$	$\frac{\sqrt{\overline{u_x'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_n'^2}}}{U_o}$	$\frac{\sqrt{\overline{v_\theta'^2}}}{U_o}$	$100\frac{-\overline{u_x'v_n'}}{U_o^2}$	$100\frac{-\overline{u_x'v_\theta'}}{U_o^2}$	$\frac{-\overline{u_x'v_n'}}{q^2}$	$\frac{-\overline{u_x'v_\theta'}}{q^2}$	$\frac{n_e}{\delta_r}$	$\frac{\epsilon}{U_\delta \delta_p^*}$	$\frac{\ell_p^*}{\delta_r}$	$\frac{\ell}{\sqrt{(a+0.8\delta_a)(b+0.8\delta_b)-ab}}$
0.0078	0.342	-0.087	-0.010	0.039	0.026	0.020	0.0516	0.0110	0.196	0.042	0.0210	0.0004	0.0035	0.0054
0.0104	0.366	-0.091	-0.013	0.038	0.027	0.027	0.0520	0.0146	0.181	0.051	0.0279	0.0009	0.0087	0.0134
0.0149	0.382	-0.094	-0.013	0.037	0.026	0.027	0.0460	0.0145	0.164	0.052	0.0400	0.0013	0.0134	0.0209
0.0201	0.408	-0.097	-0.012	0.036	0.025	0.027	0.0405	0.0076	0.152	0.029	0.0538	0.0010	0.0113	0.0175
0.0278	0.441	-0.100	-0.011	0.035	0.025	0.027	0.0347	0.0052	0.136	0.020	0.0745	0.0012	0.0135	0.0209
0.0365	0.468	-0.101	-0.011	0.033	0.023	0.027	0.0288	0.0075	0.123	0.032	0.0979	0.0012	0.0154	0.0239
0.0468	0.497	-0.099	-0.011	0.032	0.023	0.028	0.0253	0.0049	0.109	0.021	0.1255	0.0012	0.0164	0.0255
0.0597	0.527	-0.096	0.014	0.032	0.023	0.028	0.0235	0.0048	0.102	0.021	0.1600	0.0012	0.0176	0.0273
0.0752	0.563	-0.091	0.016	0.032	0.023	0.029	0.0236	0.0041	0.099	0.017	0.2015	0.0014	0.0195	0.0303
0.0987	0.605	-0.081	0.018	0.032	0.023	0.030	0.0238	0.0045	0.098	0.018	0.2645	0.0017	0.0243	0.0378
0.1209	0.641	-0.072	0.021	0.032	0.023	0.031	0.0232	0.0071	0.091	0.028	0.3241	0.0018	0.0257	0.0399
0.1479	0.684	-0.063	-0.022	0.032	0.024	0.031	0.0248	0.0112	0.096	0.043	0.3967	0.0020	0.0275	0.0427
0.1811	0.733	-0.053	-0.024	0.033	0.024	0.032	0.0283	0.0146	0.105	0.054	0.4856	0.0023	0.0300	0.0465
0.2130	0.781	-0.043	-0.027	0.032	0.024	[illegible]	0.0250	0.0181	0.096	0.070	0.5711	0.0022	0.0305	0.0473
0.2488	0.826	-0.036	-0.028	0.031	0.023	0.031	0.0255	0.0176	0.106	0.073	0.6670	0.0024	0.0330	0.0512
0.2858	0.876	-0.030	-0.028	0.028	0.020	0.028	0.0206	0.0131	0.107	0.068	0.7663	0.0021	0.0324	0.0503
0.3183	0.910	-0.025	-0.027	0.023	0.017	0.022	0.0147	0.0096	0.112	0.073	0.8535	0.0018	0.0325	0.0505
0.3505	0.941	-0.021	-0.026	0.016	0.011	0.015	0.0047	0.0036	0.078	0.060	0.9399	0.0008	0.0259	0.0402
0.3921	0.958	0.015	-0.022	0.005	0.004	0.001								
0.4778	0.965	-0.007	-0.017	0.003	0.001	0.001								
0.6027	0.971	0.000	-0.014	0.003	0.001	0.001								
0.7251	0.976	0.006	-0.014	0.003	0.001	0.001								
0.8057	0.979	0.008	-0.013	0.003	0.001	0.001								

$\delta^*_p = 0.08680$ $\delta_r = 0.37296$ $\frac{U_\delta}{U_o} = 0.93220$

$a = 0.15400$ $\delta_a = 0.37296$ $b = 0.07700$ $\delta_b = 0.17840$

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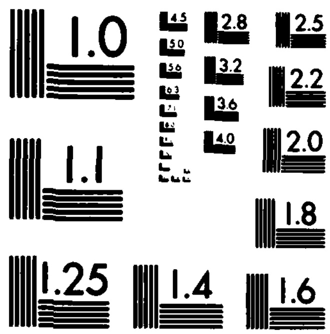

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